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CONTENTS

FROM THE CHIEF	2	99TH MC BIRTHDAY	32
<u>FEATURE ARTICLE</u>		<u>LETTERS TO THE EDITOR</u>	
Association of Military Surgeons of the U.S. (AMSUS) 77th Annual Meeting	4	42	
<u>PROFESSIONAL PAPERS</u>		<u>NOTES AND ANNOUNCEMENTS</u>	
Experiences With the Total Contact Below-the- Knee Cast and Early Weight-Bearing in the Treatment of Tibial Fractures	15	2.0 PPM or 0.2 PPM? ? ?	46
The Hematologists' Corner—Red Cell Frag- mentation Syndromes	23	Formulary Notes	46
Eye Correction Poses Problems	26	NO ₂ -O ₂ Materiel Misadventure	47
Relative Predictability of Occupational Groups and Performance Criteria in an Extreme Environment	27	Income Tax—Navy Interns and Residents	47
Hydronephrosis From Shell Fragment in Renal Pelvis	30	Occupational Therapy Technicians, Certifica- tion of	47
Prodromata in Acute Myocardial Infarction ...	37	18th Annual AFIP Course in Oral Pathology ..	47
Hearing Acuity and Exposure to Patrol Air- craft Noise	43	American Board of Surgery Exams	48
		American Board Certifications	49
		Awards and Honors	49
		USS Francis Hammond (DE-1067) Commis- sioned	52
		SecNav Visits Quantico, Va.	54
		Prisoner of War Family Assistance Officers	55
		In Memoriam	56

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Front Cover photo reveals three naval officers from the Naval Hospital, NNMC, Bethesda, Md., checking in at the Registration Desk of the 77th Annual Meeting of the Association of Military Surgeons of the U.S. They are, from left to right, CAPT Donald L. Custis, MC, USN; CAPT Albert J. Schwab, MSC, USN, and; CAPT Lay M. Fox, MC, USN.

Back Cover photo reveals VADM George M. Davis, MC, USN, Surgeon General and 1970 President of The Association of Military Surgeons of the U.S., admiring the gift (gavel) presented to him by the 1971 President of AMSUS, Marc J. Musser, M.D., Chief Medical Director, Veterans Administration.

Page 2 photo reveals VADM G. M. Davis presiding over the Annual Meeting of AMSUS, 29 Nov.—2 Dec. 1970.

We wish to acknowledge the excellent photographic support rendered by the Photography Division of the Medical Graphic Arts Dept. at the Naval Medical School, NNMC; they cheerfully and expeditiously provided the many fine pictures taken at the AMSUS Meeting.

Appreciation is also expressed for the assistance of CAPT Donald H. Gaylor, MC, USN, Head of Academic Dept., Naval Medical School, NNMC; LCDR James R. Erie, MSC, Public Affairs Officer, BUMED, and; the AMSUS Staff.



from the Chief

Although our patients are generally satisfied with the professional quality of the care they receive, often they are not satisfied with the manner in which or the attitude with which this care is provided. It is in this area—the delivery of patient care—that each of the federal medical services is seeking to make improvements, and improvements are indeed needed. Paradoxically, we are trying to make these improvements at a time when we are experiencing a decrease in the number of personnel who provide these services.

In the Navy we are not experiencing a significant decrease in our work load. In fact, our inpatient and outpatient work loads for fiscal years 1969 and 1970 were remarkably similar; and, I don't believe we will see a significant decrease in the immediate future because, despite force reductions and fewer casualties, the total number of people we will be trying to support is not lessening significantly. This management problem of decreasing resources and an unchanging work load is one shared by each of the federal medical services.

Nevertheless, the success of our efforts to improve the delivery of the care we in the military medical departments provide, as Doctor Rousselot recently said, can make a "very positive contribution" toward one of this Nation's major goals—an all volunteer force. Let me mention three areas where I feel we have made improvements in the Navy's health care system during the past year.

First, in spite of budgetary constraints, we have enjoyed remarkable success in our hospital construction program. Four hospitals are currently under construction and should be completed next year or by early 1972; and we have received approval to start four more next year. We are planning an active program to refurbish our many dispensaries that so desperately need to be improved. Hopefully, our efforts will result in medical facilities that are more capable, space-wise, of meeting our needs and more aesthetically appealing to our patients and to our physicians who work therein.

Second, we have recently received approval to study and present, on a trial basis, a regional medical operations plan developed through the wholehearted cooperation of BUMED planners and physicians in the field. One of our major problems has always been the difficulty of providing prompt medical care in areas where there are heavy concentrations of fleet personnel and their families. Historically our efforts have been fragmented with frequent duplication of the services provided causing wasted man-hours. This prototype program, which hopefully will be activated in the Norfolk-area, draws together the medical facilities under the control of one medical administrator who can be more responsive to the problems that often occur in our large port cities. The results should be better care for our patients and more professionally rewarding duty for our personnel. This new concept is an example of the type change we may need to meet the many challenges of Navy medicine in the 70's.

Third, in cooperation with our two sister services and through the active able leadership of Doctor Rousselot, there have been many improvements that affect our most important resource—our people. These improvements should provide better training opportunities, more professionally rewarding duty, and, I believe, more professional satisfaction. The nature and significance of these innovations will be elaborated upon in future issues of this publication. ☸



ASSOCIATION OF MILITARY SURGEONS OF THE U.S. (AMSUS) 77TH ANNUAL MEETING

Emphasizing the theme "Controversies in Medicine", the 77th annual meeting of AMSUS was held at the Washington Hilton Hotel, Washington, D.C., 29 Nov. through 2 December 1970. Following opening remarks by the General Chairman, RADM Felix P. Ballenger, MC, USN, Commanding Officer NNMC, the invocation was delivered by RADM Francis L. Garrett, CHC, USN, Chief of Chaplains. Presiding over the meeting was VADM George M. Davis, MC, USN, Surgeon General and President of the Association. His rousing address challenged those in attendance to participate actively in this Association, with its great potential as "The Medical Society of the Federal Agencies". Roger O. Egeberg, M.D., Assistant Secretary for Health and Scientific Affairs,

Department of Health, Education and Welfare delivered the Keynote Address. Other greetings from Chiefs of Federal Medical Services were extended by: Louis M. Rousselot, M.D., Assistant Secretary of Defense (Health and Environment); LTG Hal B. Jennings, Jr., MC, USA, Surgeon General U.S. Army; LTG Alonzo A. Towner, MC, USAF, Surgeon General U.S. Air Force and Second Vice President of the Association; Jesse L. Steinfeld, M.D., Surgeon General U.S. Public Health Service, and; Marc J. Musser, M.D., Chief Medical Director, Veterans Administration and President-elect of the Association.

RADM George M. Reifenstein, MC, USNR, Technical Director, Clinical Research and Medical



VADM George M. Davis, Surgeon General and 1970 President of AMSUS, cut the ribbon for official opening of Exhibit Hall on 29 Nov. 1970.



Education, and Special Consultant to the Surgeon General of the Navy, served as Chairman of the Scientific Program. He presided over the symposium "Controversies of Management: Inflammatory Bowel Disease", commenting that this represented the first instance at an AMSUS meeting when a single clinical subject was discussed in depth and viewed from the perspectives of a variety of medical disciplines.

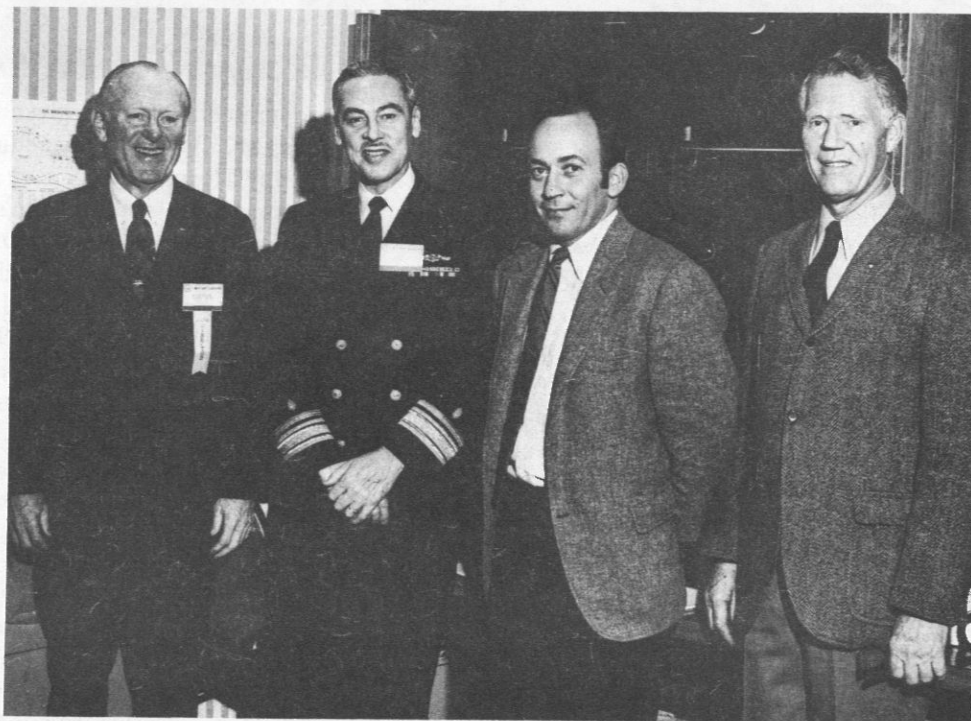
CAPT William M. Lukash, MC, USN, the Program Chairman, opened the session by considering the incidence and significance of inflammatory bowel disease as a military problem. His data indicated that inflammatory bowel disease occurs with three times the frequency of that found in a comparable civilian study in the city of Baltimore. In contrast to the stable incidence level of regional enteritis in 1965-1969, ulcerative colitis was found to increase in frequency over this same period, an increase which correlated with our military escalation in Viet Nam. The higher incidence of ulcerative colitis was directly related to greater susceptibility in military personnel under the age of 20 years.

The keynote presentation was given by MGEN Carl W. Hughes, MC, USA, Commanding General, Walter Reed Army Hospital, who gave a historical review of the clinical course of Crohn's disease in our former president, General Dwight D. Eisenhower. The initial indication of terminal ileitis in the patient was a classical string sign noted on a small bowel X-ray study performed 11 May 1956. Finally, because of progressive abdominal discomfort and partial intestinal obstruction, a by-pass ileo-transverse colostomy was performed on 9 June 1956. Subsequent follow-up by X-ray studies, and observation at surgery performed for other conditions, indicated that the by-pass anastomosis functioned normally and that the retained segment of ileum remained clinically inactive, although histologic study at autopsy examination revealed microscopic evidence of classical granulomatous enteritis.

Many of the visiting honorary members of AMSUS from foreign countries attended this session and were quite impressed with the differential radiographic features of Crohn's disease as presented by LCOL Maurice M. Reeder, MC, USA, Tripler Army



Greetings between Surgeons General of U.S. and Chinese (Republic of Taipei) Navies.



From left to right: RADM W. Welham, MC, USN (Ret), Executive Director of AMSUS; RADM R. E. Faucett, MC, USN, Assistant Chief BUMED; Mr. Ted Evans, Convention Manager, and; LCDR J. J. Olson, MSC, USN (Ret) of the Awards Committee.



RADM G. H. Reifenstein, MC, USNR, Scientific Program Chairman.



CDR M. F. Fornes, MC, USN, Naval Hospital, NNMC.



"Controversies of Management; Inflammatory Bowel Disease."



Hospital, who has studied and gathered material while assigned to the Armed Forces Institute of Pathology. He contrasted the X-ray findings of inflammatory bowel disease with some of the tropical conditions that are so much more common on foreign shores, particularly Southeast Asia.

The cutaneous manifestations of inflammatory bowel disease were dramatically demonstrated by Captain Samuel L. Moschella, MC, USN, (Ret.), now Chief of Dermatology at the Lahey Clinic. Dr. Nathaniel Zvaifler, Professor of Medicine at the California Medical School of San Diego, discussed another of the extraintestinal manifestations—the arthritic complications. He interjected a somewhat controversial point of view that perhaps some of the rheumatoid features seen with this condition occur in no higher frequency than occurs in the general population. He also mentioned that though one usually considers the treatment of these joint changes to be directly related to the treatment of the underlying bowel disease, at times more specific treatment is required such as salicylates, Indocin, or Butazolidin. CDR Robert P. Bishop, MC, USN, Chief of Medicine at St. Albans Naval Hospital, however, expressed the opinion that in his ten years of clinical experience with these patients, he has concluded that

there is a direct relationship between the extraintestinal manifestations and the primary disease process of the bowel. He likened the whole process to the spectrum of collagen vascular disease in which many end organs are affected. He presented a highly unusual case of a patient who presented a peculiar type of hyperplastic growth in the gingival folds of the mouth, and who later developed classical regional ileitis with a perianal lesion identical to the gingival growth. Biopsy of both lesions revealed granulomas and inflammatory reaction compatible with that seen in the gastrointestinal tract. The oral and intestinal manifestations both responded nicely to corticosteroid therapy.

CDR Michael F. Fornes, MC, USN, Head of the GI Diagnostic Clinic at Bethesda Naval Hospital, enlightened the audience concerning the use of the rectal biopsy. He pointed out that the rectal biopsy is a simple procedure associated with no unusual morbidity. He feels it is indicated in any patient having proctoscopic examination, where there is evidence of mild inflammation or a suggestion of inflammatory bowel disease. The usual pathologic report of nonspecific inflammation on rectal biopsy is not warranted, for current specific histologic criteria aid in a more definitive diagnosis. He mentioned that ulcera-

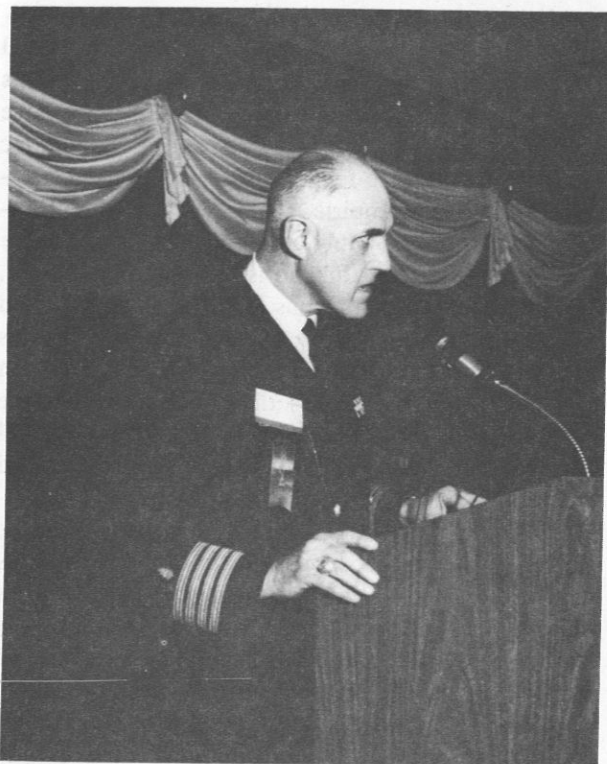
tive colitis characteristically causes a decrease in goblet cells and PAS mucin-staining material along with a higher percentage of neutrophilic vice mononuclear cell reaction, and that Crohn's disease will generally be characterized by normal goblet mucin staining with fibrosis, granulomas, and a higher preponderance of mononuclear cell infiltrate. LCOL Ralph Wells, MC, USA, Brooke Army Hospital, emphasized the less aggressive nature of ulcerative proctitis when compared with ulcerative colitis universalis, but COL David Langdon, MC, USAF of Lackland Air Force Base Hospital, stressed the importance of visualizing more proximal portions of the colon, with the added point that the newer 105 cm. flexible colonoscope is helpful in achieving this goal.

The panel on treatment was notable for its candid, highly controversial response to the many questions posed by the panel moderator, LCDR Raymond B. Johnson, MC, USN from Bethesda Naval Hospital. Dr. Bentley P. Colcock, a national authority on surgical management of this disease from Lahey Clinic supported the concept that regional enteritis is a medical disease and that surgery is only considered for treatment of complications, whereas ulcerative colitis, when the indications are present, generally

can be cured by a colectomy. CAPT Theodore Wilson, MC, USN, Chief of Surgery at Bethesda Naval Hospital, expressed his concern regarding patients recently returning from Viet Nam who may have acute ulcerative amebic colitis rather than idiopathic ulcerative colitis. He felt, however, with current serologic tests, that empiric treatment with antiamebicide therapy is probably not indicated in all these patients unless the diagnosis is established. Dr. Thomas Hendrix from Johns Hopkins University had serious doubts about the efficacy of Azulfidine as seen in clinical practice. He has generally not been highly impressed with this drug and feels that the hallmark in medical treatment of inflammatory bowel disease is the use of corticosteroids. Dr. Howard Ticktin, Professor of Medicine at George Washington University reported his recent medical experience in the use of immunosuppressive therapy in Crohn's disease. He reserves this treatment for those patients who have failed to respond to medical management and for those in whom surgery would be impossible because of the risk of short bowel syndrome. In his experience five patients have responded to a combination of corticosteroids and Imuran therapy with an excellent clinical remission. He mentioned that this



"Problems Involved in Integrating Teaching and Research." Panelists CAPT L. F. Miller, MC, USN, BUMED (left) and Francis Jackson, M.D., Director of Surgery, VA Central Office (right).



"Controversies in Diagnosis: Alleged Drug Reactions." Chairman CAPT B. Smith, MC, USN, Director, Armed Forces Institute of Pathology.



"Management of Maxillofacial Trauma." Presiding: RADM E. C. Raffetto, DC, USN, Assistant Chief for Dentistry, BUMED.



Medical Specialist Section Chairman, CDR L. Hoover, MSC, USN, Naval Hospital, NNMHC.

method of treatment is in an investigative phase. In accordance with this fact, he follows these patients on a weekly to biweekly basis with frequent monitoring of hematologic parameters.

The symposium was considered highly successful from the points of view of both the audience and the various speakers who had a chance to present their respective opinions on this controversial issue. Inflammatory bowel disease constitutes a significant problem in the military, challenging clinicians in military medicine to promote and develop a program of controlled clinical trials in order to better define the optimum therapeutic approach.

An additional panel on "Problems Involved in Integrating Teaching and Research" was chaired by CAPT J. William Cox, MC, USN, BUMED; among the panelists was CAPT Lloyd F. Miller, MC, USN, BUMED.

Another panel discussion centered on "Controversies in Management of Neurosurgical Problems: Intracranial Foreign Bodies, Etc. . . .," moderated by C. Hunter Shelden, M.D., Chief Neurological Surgery, Huntington Memorial Hospital, Pasadena, Calif., and Senior Consultant in Neurosurgery to the

Surgeon General, USN; CAPT Nicholas P. Kitrinis, MC, USN, BUMED, served as a panelist.

A panel discussion on "The Federal Physician's Attitude Toward Alcoholism" was chaired by CAPT Charles L. Waite, MC, USN, CO Naval Medical School, NNMC. Among the panelists was CDR Robert E. Strange, MC, USN, Naval Hospital Philadelphia. Co-lecturer on the subject "New Generation of Military Hospitals" was LCDR John Hendren, MSC, USN, Office of Assistant Secretary of Defense, Health and Environment.

RADM E. C. Raffetto, DC, USN, Assistant Chief for Dentistry, BUMED, presided over the discussion on "Management of Maxillofacial Trauma". Presenting the oral surgical viewpoint was CAPT Ernest W. Small, DC, USN, Naval Dental School, NNMC. CDR Hugh O. DeFries, MC, USN, Naval Hospital, NNMC, discussed the medical viewpoint.

In the Dentistry Section Meeting, CDR Gerald M. Bowers, DC, USN, Naval Dental School, NNMC, delivered a paper entitled "Plaque Control Does Pay".

CAPT Robert M. Tennille, Jr., MSC, USN, CO Naval School of Health Care Administration, NNMC, was among the panelists in a symposium on Controversies in Training Health Care Administrators

moderated by Mr. Richard Stull, Executive Director, American College of Hospital Administrators.

In the Medical Specialist Section chaired by CDR Lillian Hoover, MSC, USN, Naval Hospital, NNMC, LTJG John Booth, MSC, (RPT), Naval Hospital Portsmouth, Va., spoke on "Varying Approaches to Legg-Perthes Disease".

Scientific Exhibits included the following:

Cannabis: CAPT Donald H. Gaylor, MC, USN, Naval Medical School, NNMC.

Clinical Experience With Colon and Rectal Cancer: CAPT William M. Lukash, MC, USN, Nav Hosp Bethesda.

Gait Training With Abductor Braces—A Procedure in Treatment of Legg-Perthes Disease: CDR J. M. Beckwith, MSC, USN, BUMED.

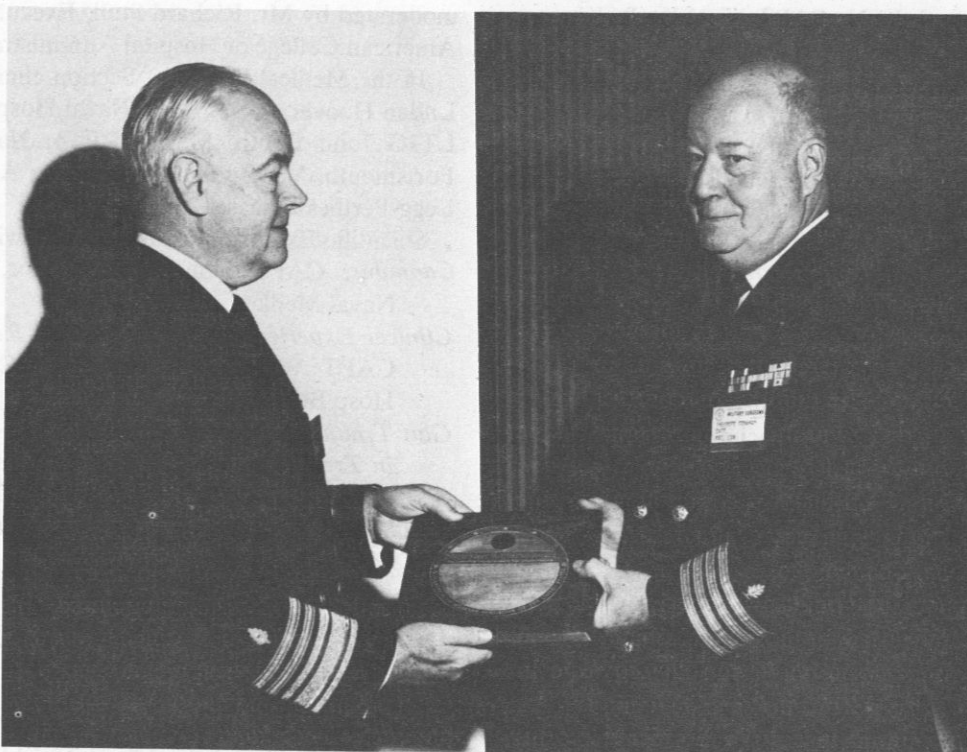
Multimedia Study of the Class V Direct Gold Restoration:
Nav Dental School, NNMC.

The Outpatient Treatment of Pilonidal Cyst Disease: CAPT Scott G. Kramer, MC, USN, Nav Hosp Boston.

Plethysmography, Diagnostic and Prognostic: CDR William Gee, MC, USN; LCDR Maurice Masar, MC, USN; and CAPT Donald Doohen, MC, USN, Nav Hosp St. Albans.



CAPT R. Stevenson, MC, USN (right) receives the Joel T. Boone Award from VADM G. Davis, Surgeon General.



CAPT T. H. Conaway, MSC, USN (right) receives the Major Gary Wratten Award from the Surgeon General.



CDR (now CAPT) T. W. Tober, MSC, USN (right) receives the Andrew Craigie Award from the Surgeon General.

*Research Performed at Submarine Medical Center,
New London, Conn.:*

CDR Thomas N. Markham, MC, USN, Nav
Submarine Medical Center, New London, Gro-
ton, Conn.

Sarcoma of the Prostate Gland:

CAPT Bruce H. Smith, MC, USN and LT
Louis P. Dehner, MC, USN, AFIP.

*Ureteral Lengthening Procedure Utilizing Spiral
Flap:*

CAPT Edward C. Sacher, MC, USN, Nav Hosp
Philadelphia.

WHO Histological Classification of Tumors:

H. Russell Fisher, M.D., USA National Com-
mittee of the International Council of Societies
of Pathology, and CAPT R. M. Drake, MC,
USN, AFIP.

Awards and Honors

The Joel T. Boone Award, established in 1969, pays
tribute to VADM Joel T. Boone, MC, USN (Ret.),
one of the most decorated medical officers in our
history. He was Chief Medical Director of the VA,
personal physician to three U.S. Presidents, awarded
the Congressional Medal of Honor, the first three-
star rank military medical officer, and President of
AMSUS in 1949. For outstanding service to AMSUS

in promoting the Association Awards Program, as
Vice-Chairman of the Military Medicine Section of
the AMA, and as AMSUS delegate to the AMA, a
bronze plaque and Life Membership were given to
CAPT Roger Stevenson, MC, USN, Senior Medical
Officer, U.S. Naval Academy. CAPT Stevenson is a
Diplomate of the American Board of Ophthalmol-
ogy, and a Fellow of the American Academy of
Ophthalmology and Otolaryngology and American
College of Surgeons.

The Major Gary Wratten Award honors the memory
of the late Major Gary Wratten, MC, USA, who died
while testing the Medical Unit Self-Contained Trans-
portable (MUST) hospital equipment under opera-
tional conditions in Viet Nam. For outstanding con-
tributions in the field of military medicine, the
bronze plaque and honorarium were presented to
CAPT Theodore H. Conaway, Jr., MSC, USN, Head
of Operational Support Planning Branch, BUMED.
CAPT Conaway led the Navy's efforts to incorporate
the most current advances in medical facility design,
personnel requirements, and equipment into the Ad-
vanced Base Functional Component System. His vig-
orous espousal of the advantages of hospital ships
was a major factor in the recommissioning, moderni-
zation and deployment of USS REPOSE and USS



CAPT Ransom Arthur, MC, USN (right) receives the William C. Porter Lecture
Award from the Surgeon General.



RADM F. T. Norris, MC, USN, Chairman of AMSUS Nominating Committee, Assistant Chief, BUMED (left), accepts the Honor Award for the Navy sound-film "The Decision Is YOURS," presented by the Surgeon General.

SANCTUARY to Viet Nam waters. His superior management of the Navy Blood Program and Navy surgical team supply blocks was cited.

The Andrew Craigie Award was presented for outstanding accomplishments in the advancement of professional pharmacy within the Federal government, to CDR Theodore W. Tober, MSC, USN; Chief, Pharmacy Service, Naval Hospital, NNMC. CDR Tober pioneered and implemented combined prescriptions and EAM card forms, procedures, reports, and related materials as appeared necessary to determine the type and cost of drugs issued to various patient categories and professional services by prescribing physicians. The first automated formulary developed in the Navy by utilization of EAM was compiled under his supervision. CDR Tober is Chairman of the Military Section of the American Pharmaceutical Association, President-elect of the District of Columbia Society of Hospital Pharmacists, and a member of the Organizing Committee,

31st International Congress of Pharmaceutical Sciences.

The William C. Porter Lecture honors a pioneer in military psychiatry, COL William C. Porter who served as a psychiatrist in the Army until his retirement in 1947. The scroll and honorarium were awarded to CAPT Ransom Arthur, MC, USN, CO Navy Medical Neuropsychiatric Unit, San Diego, Calif., and Adjunct Professor of Psychiatry, U. of California at San Diego, School of Medicine, La Jolla, Calif. CAPT Arthur delivered The William C. Porter Lecture entitled "Success is Predictable", a splendid portion of the Scientific Program which was presided over by RADM Bartholomew W. Hogan, MC, USN (Ret.), Deputy Medical Director of the American Psychiatric Association and a previous Surgeon General.

Founder's Medals. Authorized by the Executive Council of AMSUS in 1941 to commemorate the

50th Anniversary of the founding of the Association, the Founder's Medal, scroll and Life Membership are given each year for outstanding contributions to military medicine and for meritorious service to the Association. There were three recipients in 1970.

RADM Felix Ballenger, MC, USN, CO of the NNMC in Bethesda, Md., General Chairman of the Committee for the 77th Annual Meeting of AMSUS, was cited for his outstanding contributions in developing the program.

RADM George H. Reifenstein, MC, USNR, Technical Director, Clinical Research and Medical Education, U.S. Navy, was cited for his outstanding contributions in developing and coordinating the Scientific Program for the Annual Meeting. RADM

Reifenstein was Chairman of the Scientific Program Committee.

AMSUS Past President, MGEN James T. McGibbony, USA (Ret.), former Surgeon General of the Army, was cited for meritorious service to the Association. General McGibbony is presently Director of the Department of Health, Welfare and Environmental Services, Jacksonville, Fla.

We are indebted to CAPT W. M. Lukash, MC, USN, Naval Hospital NNMC, and to the Photography Division of the Medical Graphic Arts Dept. at the Naval Medical School, NNMC for their important contributions to this report on the 77th Annual Meeting of AMSUS. ☸

EXPERIENCES WITH THE TOTAL CONTACT BELOW-THE-KNEE CAST AND EARLY WEIGHT-BEARING IN THE TREATMENT OF TIBIAL FRACTURES

By LCDR Alvin H. Crawford, MC, USN, Orthopedic Service, Naval Hospital Boston, Chelsea, Massachusetts. Through the Courtesy of the Boston Orthopedic Club.

The treatment of tibial fracture continues to be an enigma. Through the years many methods have been advocated, and as with the treatment of other conditions, the increase in the quantity of methods tends to reflect the decrease in the quality of results.

Gierd in 1940 first described early weight-bearing in tibial fractures.

Albert used the walking caliper for fractures before union and felt that its early application did not delay union.

Weissman, Herold and Engleberg started weight-bearing at an average time of seven weeks.

Dehne's method of treating all fractures with early weight-bearing was considered by many to be inferior to methods using traction, two-pin fixation, and internal fixation devices, because of the possibilities of shortening and angulation.

There is some unanimity today in the concept that closed tibial fractures should be treated closed and open ones without internal fixation, but there are as many authors reporting good results with either and/or both types of treatment.

In vogue today is the concept of early weight-bearing of tibial fractures.

A further innovation to this treatment is the use of early weight-bearing in a functional below-the-knee cast. Augusto Sarmiento proposed the concept that uneventful healing of tibial fractures will occur in the presence of free motion of the knee joint and early weight-bearing.

A below-the-knee cast molded in a manner resembling that of the patella tendon-bearing prosthesis stabilizes the proximal fragment of a tibial fracture. The firm molding of the prosthesis over the medial flare of the tibia, the patella tendon and popliteal space, makes it possible for the amputee to bear full weight on his stump without the need for a thigh corset. In this cast, weight-bearing pressures are transmitted from the ground to the proximal end of the tibia, virtually by-passing the fracture site and suspending the fractured bones.

Our method of application has been in accordance with Sarmiento's in all modalities except for intensive molding of the patella. We do not believe that the patella tendon is a major contributor to the distribution of weight-bearing pressures in this cast. We tend to emphasize direct molding of the tibial ridge in near anatomic alignment to insure as much contact

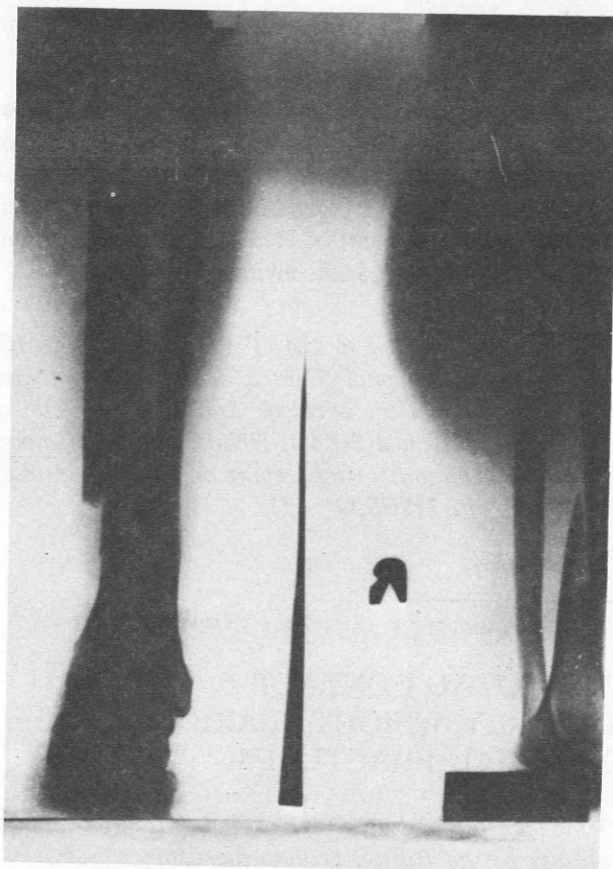


Figure 1-a.

with the shaft as possible. The cast is routinely applied two weeks postfracture after prior immobilization in a long leg compression dressing, but in isolated selective cases, the cast has been applied earlier.

Method of Application

The cast should not be applied until acute swelling has subsided. No anesthesia is necessary.

One layer of Webril is rolled on the leg from the toes to a level of two inches above the knee.

With the ankle in neutral position, one roll of plaster 4" wide is rolled around the foot and ankle.

Once the foot position has set, the cast is extended to just below the tibial tubercle.

Firm molding must be obtained over the anterior tibial surface, the lateral peroneal mass and posterior leg. Efforts should be made at this time to shape the cast in a triangular manner to prevent rotation of the fragments. Molding is maintained and continued over the patella tendon and popliteal space.

The cast is then extended cephalad 2" above the patella with the knee at a 45° angle. The lateral

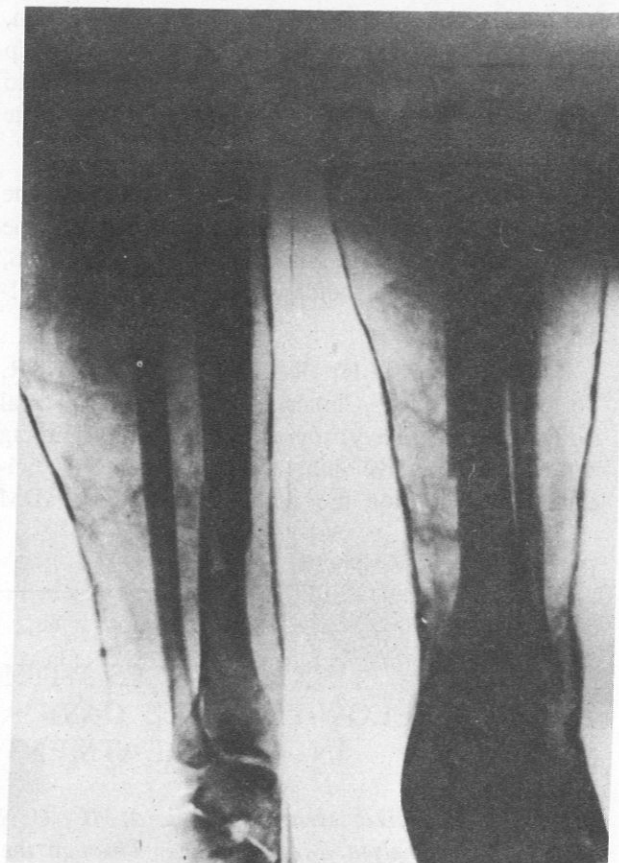


Figure 1-b.

wings should be as high as possible and should fit snugly over the femoral condyles to enhance rotational stability. The posterior wall should not be so high as to irritate the hamstring tendons during walking.

The proximal portion of the cast is trimmed down to resemble the patella tendon-bearing prosthesis, a heel is applied, and no weight-bearing is allowed for 48 hours.

We have treated 71 fractures in 69 patients, open and closed, with or without fibular fractures. No breakdown was made as to proximal/middle or distal third fractures. The arbitrary criterion used to establish the time of union was strictly the X-ray evidence of callous formation; many patients were pain-free and clinically stable prior to this time.

Closed injuries, as expected, healed faster than most open ones; the average was four months, shortest two months, and longest eight months.

Open injuries took an average of six months to achieve union; the shortest required three months, and the longest took 14 months. These figures appear to be high but most of the open injuries occurred in

the Republic of Vietnam and were extremely contaminated.

Case Material

This series of cases is presented to illustrate the versatility and flexibility of the cast.

Figure 1-a.—Comminuted D/3 tibia with a proximal fibula fracture;

Figure 1-b.—X-rays in plaster;

Figure 1-c.—Uniting at 4½ months.

Figure 2-a.—M/3 non-displaced fracture, initially placed in a total contact cast;

Figure 2-b.—Healed at two months.

Figure 3-a.—A high velocity missile wound,

Figure 3-b.—Following débridement and as he arrived at Chelsea; note the tremendous bone loss.

Figure 3-c.—A total contact cast was applied and the patient was ambulated at two weeks or one month post injury.

Figure 3-d.—At time of transfer to a V.A. hospital. We feel that this represents a true case of fibular hypertrophy in a 19-year-old.

Figure 4-a.—Another high velocity missile wound,

Figure 4-b.—With tremendous bone loss,

Figure 4-c.—As he arrived at Chelsea.

Figure 4-d.—A cross leg pedicle flap was affected followed by bone grafting.

Figure 4-e.—A total contact cast was applied and maintained until actual trabeculation and incorporation of the bone graft had occurred.

Movie

The movie presents one of two patients treated for bilateral tibial fractures in total contact casts . . . the patient walking with two canes, . . . and as he progressed to one cane and finally, without assistance . . . this also demonstrates the rotational stability afforded by extending the lateral margins of the cast over the femoral condyles, especially with the knee in extension.

Complications

Abrasions of the popliteal area and *cast saw abrasions* were the most common, but were of minor importance.

Angulation has remained less than 15° by X-ray and has yet to cause a deformity of clinical alignment. If the clinical alignment is good and the tibia

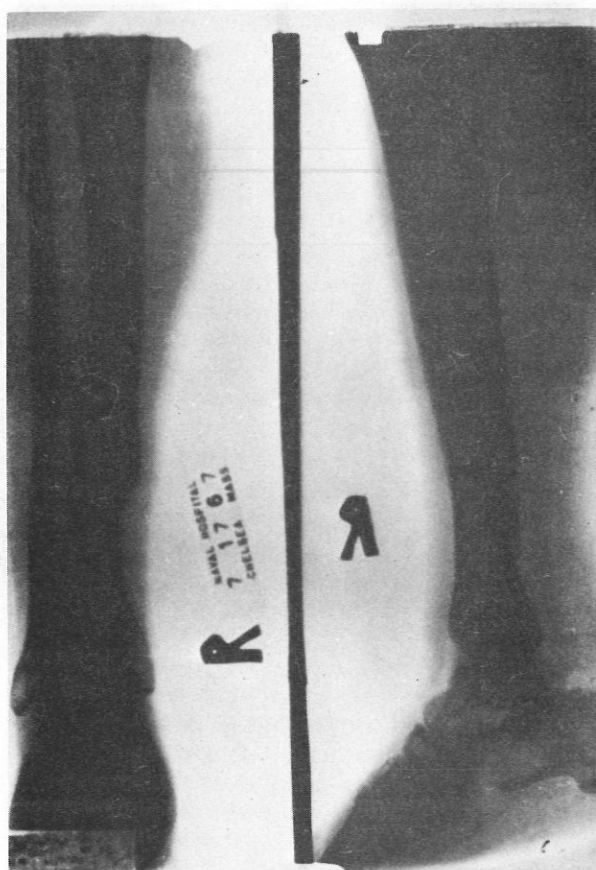


Figure 1-c.

heals solidly without pain, the loss of anatomic X-ray position is inconsequential.

Shortening, except in cases where there was actual loss of bone, has been less than 1.5 cm. in any case. We now have scanograms on *all* our patients to document this. There were no *delayed unions* or *nonunions*.

Conclusion

Our experiences have not been as gratifying as Sarmiento's. We do feel that in some of our cases, the clinical findings alone would allow us to walk our patients out of plaster before X-ray evidence of complete union is present. When dealing with a population composed mainly of young marines, however, such risk would be fraught with danger.

We do not feel that the virtue of the cast lies so much in the patella tendon-bearing aspect as in the total contact. This rigid immobilization to prevent rotation, shortening and angulation depends on the careful application and molding of the cast; it should be done by the attending M.D. and not by technicians.

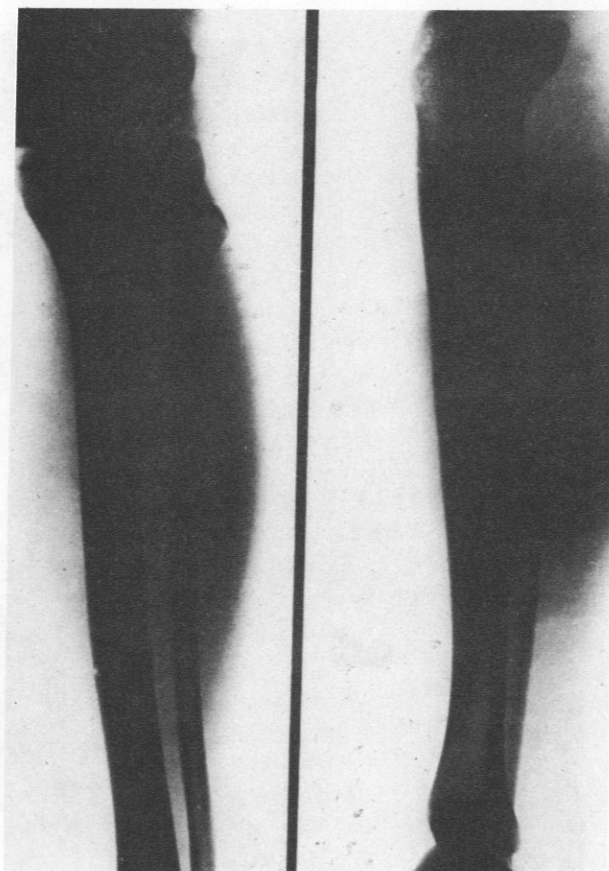


Figure 2-a.

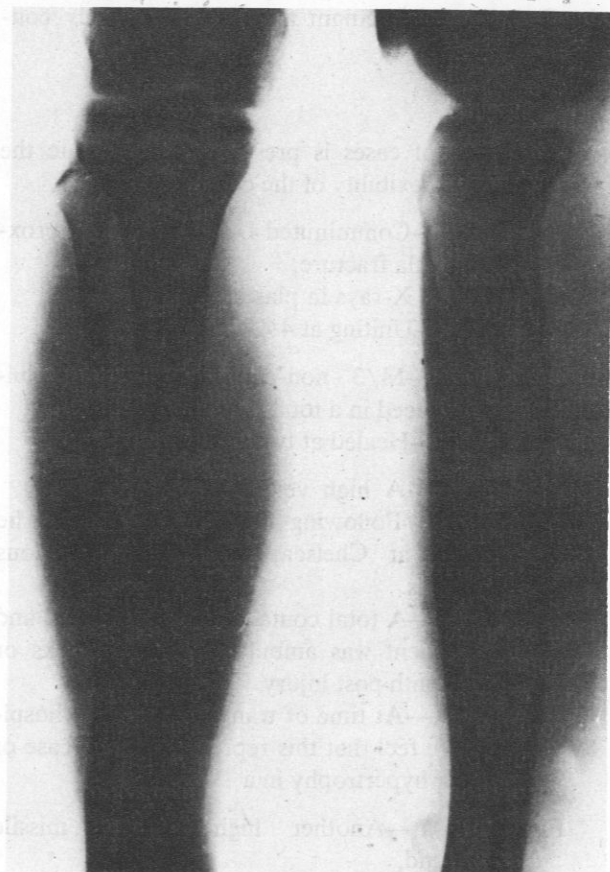


Figure 2-b.

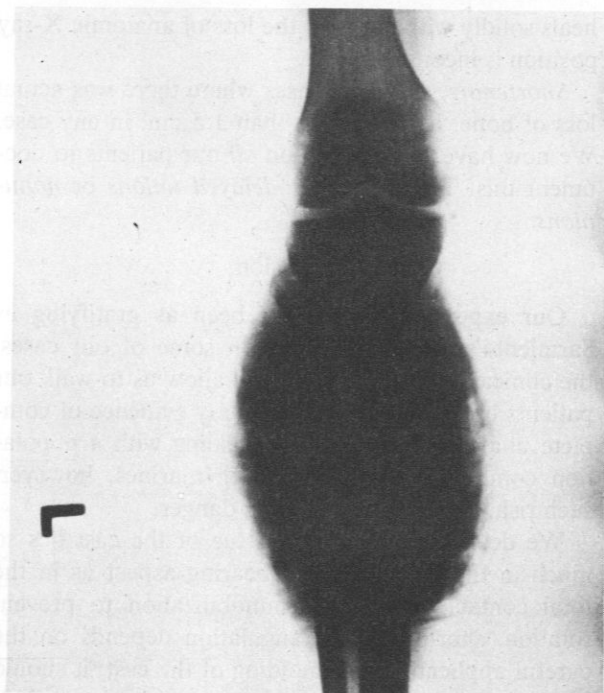


Figure 3-a.

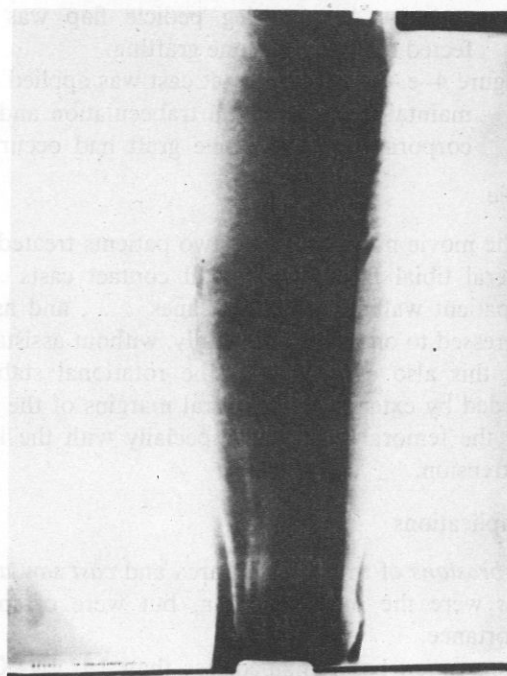


Figure 3-b.

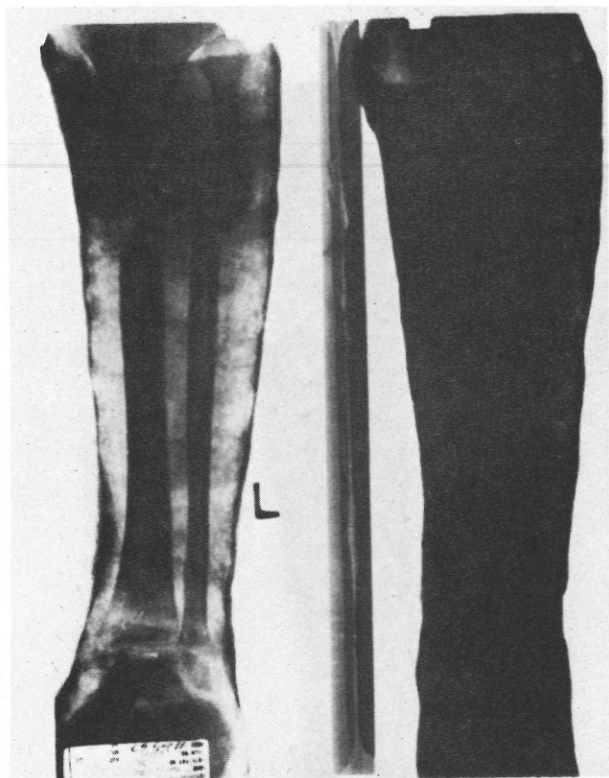


Figure 3-c.

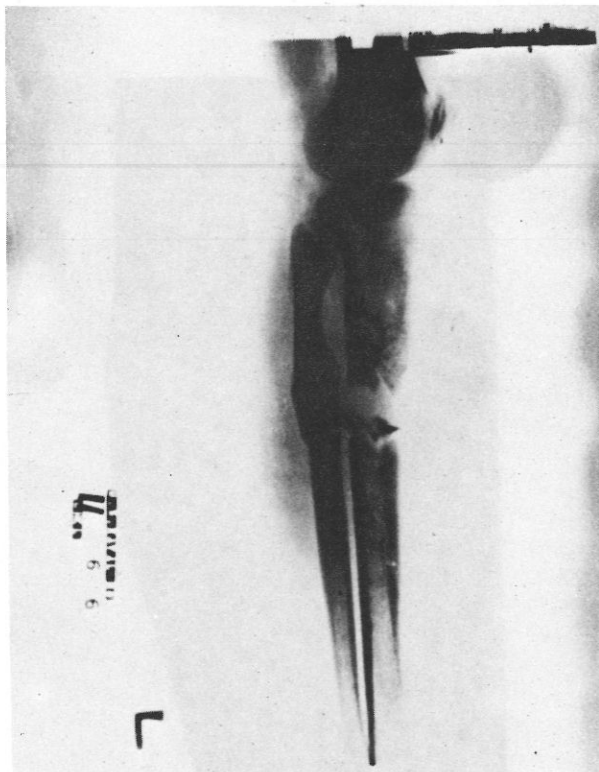


Figure 3-d.

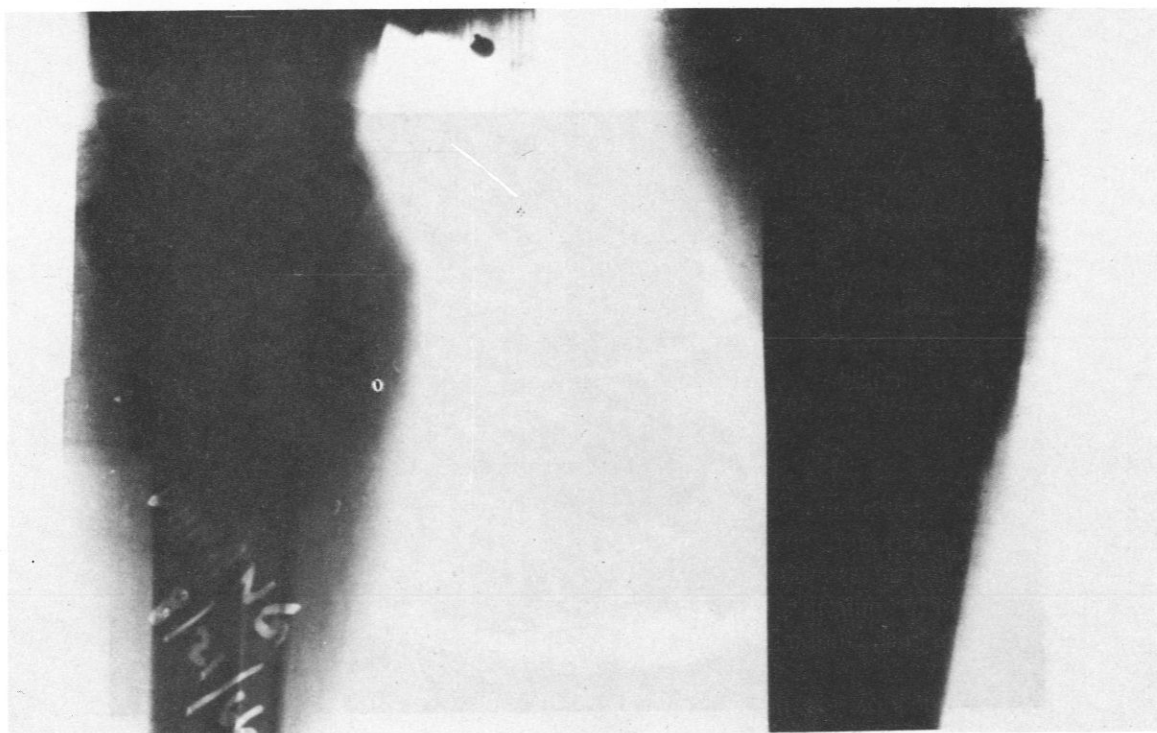


Figure 4-a.

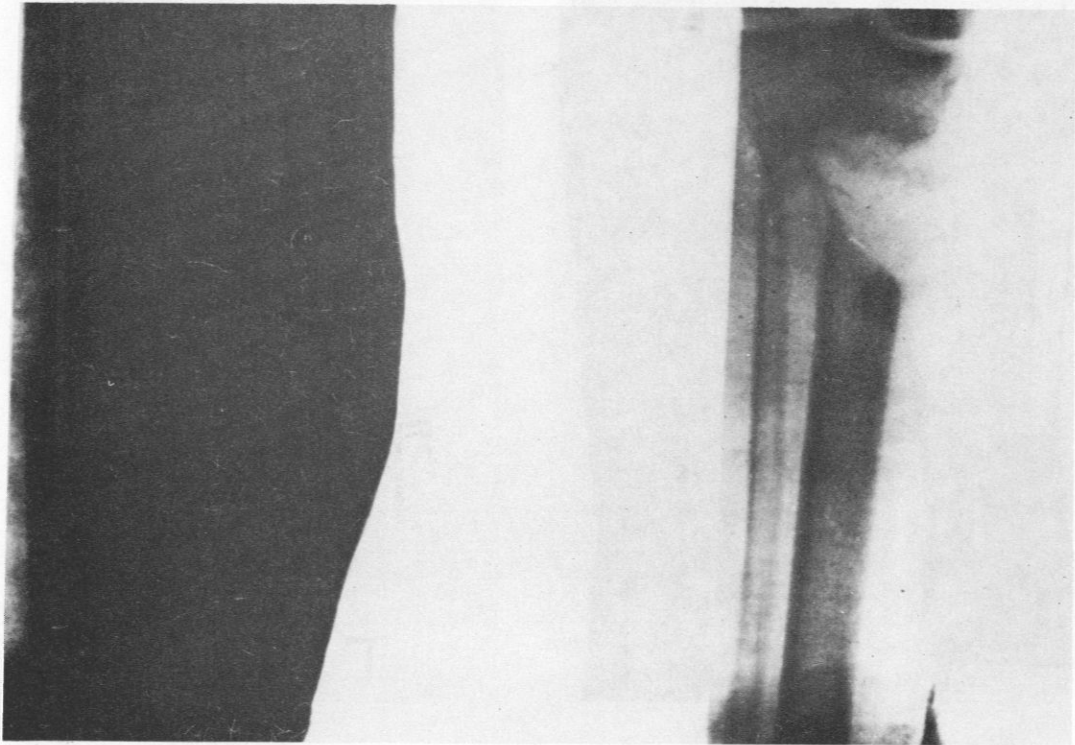


Figure 4-b.

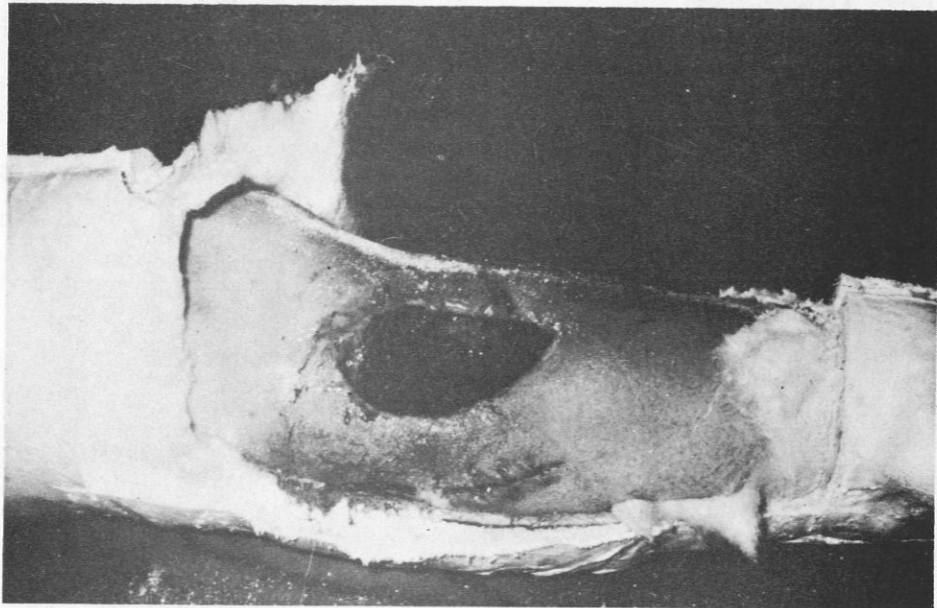


Figure 4-c.



Figure 4-d.



Figure 4-e.

Finally, we have not been able to demonstrate a significant difference in healing time using this method as opposed to other closed methods. This method offers the following advantages:

(1) Comfort provided by the below-the-knee cast

(2) Ability to retain knee motion

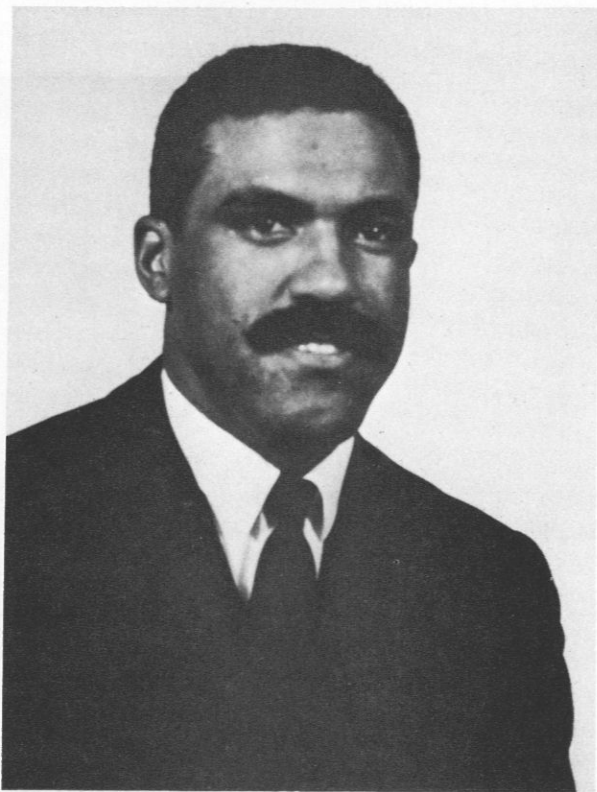
(3) Maintenance of the limb in a more physiological condition throughout the healing process

(4) Retention of functional activity of the extremity during healing with elimination of need for extensive rehabilitation of the knee and thigh muscles after healing.

These advantages are considered *significant* and have encouraged us to continue to employ this method of treatment for tibial fractures.

The above paper was presented by LCDR Crawford on Residents' Night of the Boston Orthopedic Club in February 1970. Many fine papers were submitted in competition from residents in the New England area. Dr. Crawford's fine paper was awarded first prize by the Boston Orthopedic Club. After completing one year TAD to Children's Medical Center and Harvard Medical School, the author has returned to Naval Hospital Boston where he is a member of the staff.

We are grateful to J. Drennan Lowell, M.D., Secretary of the Boston Orthopedic Club and consultant



to the Naval Hospital Boston, for his assistance in making Dr. Crawford's paper available for publication. The clerical support rendered by Mrs. Judy McCrea is appreciated. ☸

(Continued from p. 41)

larger than the nontransmural infarcts more likely to occur in the patient with prodromata. The finding of Miller and associates that transmural infarction is five times more common in cases of acute coronary artery occlusion than in cases in which there is a prior syndrome of coronary insufficiency supports this thesis. These observations suggest the need for more precise clinicopathologic correlation related to the pre-infarction state.

When prodromata to myocardial infarction emerge, it is likely that circulation to the myocardium is gradually being compromised, or the work of the heart episodically exceeds the available oxygen supply, or both. A significant rise in blood pressure during spontaneous and exertional angina pectoris is now well recognized. Modest pulse rate increases have also been observed in our laboratory. The result

is a significant increase in cardiac pressure-work per minute. Alterations during emotional stress may also result in increased myocardial oxygen requirement. If the patient with gradually progressive coronary artery disease has an exaggerated pressor response to his ischemic pain, the stage may be set for a crescendo cycle of ischemia, pain, pressure rise, more ischemia expressed as prodromata, and finally acute infarction. We suggest, therefore, that the emergence of prodromata represents a dynamic interplay between changes in the coronary and systemic circulation. Appropriate therapy for the impending coronary syndrome must be based on improved understanding of the pathophysiology of prodromata.

(The figures and references may be seen in the original article). ☸

THE HEMATOLOGISTS' CORNER— RED CELL FRAGMENTATION SYNDROMES

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In the past several decades considerable attention has been paid to the appearance in the circulating blood of distorted or spiculated red cells, the "schistocytes", accompanied by pieces of hemoglobin-containing fragments of red blood cells. Appearing in numerous and varied pathologic states, these fragments are the end result of a process in which the intact erythrocyte has been exposed to severe shearing forces which distort and eventually fragment the cell membrane (Fig. 1). Accompanying these fragments and schistocytes in the peripheral blood are red cell anisocytosis (variation in cell size), poikilocytosis (variation in cell shape), and polychromatophilia (indicating an increased reticulocyte count), all together reflecting the presence of erythrocyte hemolysis with the appropriate marrow erythroid hyperplastic response.

Those disease states which are characterized by fragmentation can for the sake of discussion, be divided into two groups, viz., those in which the platelet count is normal, and those in which the platelet count is reduced usually to levels less than 100,000 per mm³. The first group includes diseases in which fragmentation occurs because of stress to the red cell in the macrocirculation, as in the hemolysis associated with cardiac valve prosthesis^{1,2}. The second group includes all those diseases in which the red cell fragmentation occurs in the microvasculature, hence, the designation "microangiopathic hemolytic anemia"³⁻⁵. In this group are: the hemolytic-uremic syndrome usually seen in childhood, thrombotic thrombocytopenic purpura usually seen in adulthood, malignant hypertension in association with acute renal failure, disseminated intravascular coagulation of any cause, collagen vascular diseases—most notably polyarteritis nodosa and systemic lupus erythematosus, carcinomatosis, renal homograft rejection and, in rare instances, ulcerative colitis.

In 1954 there appeared the first report of anemia occurring after the insertion of an aortic valve prosthesis⁶, but it was not until 1961 that fragmentation and red cell hemolysis were shown to be at fault⁷. Numerous reports have appeared since, and have documented an incidence of 5% of overt fragmentation and hemolytic anemia following the insertion of aortic valve prosthesis^{8,9}. Interestingly enough, this state has also been documented in the presence of severe valvular stenosis, prior to valve surgery. Invariably the onset of the fragmentation process coincides with the appearance of regurgitation and/or paravalvular leaks, and is further char-

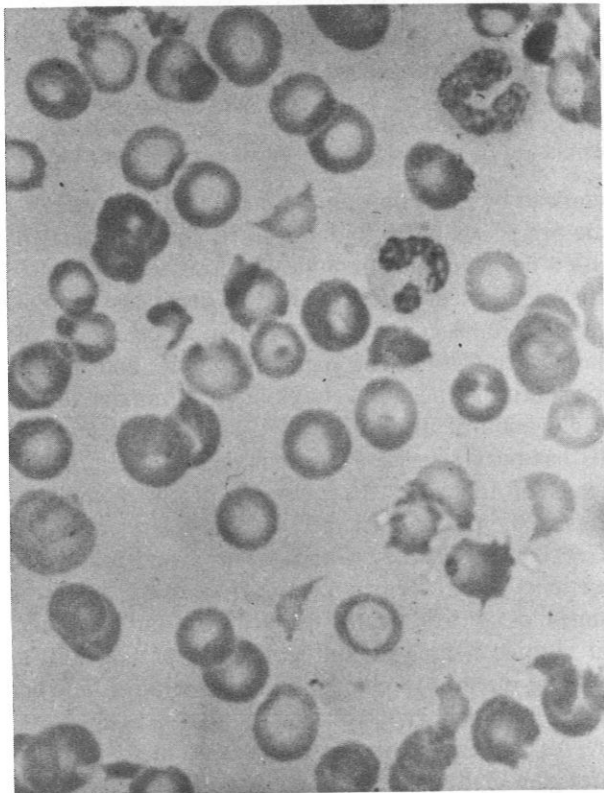


Fig. 1. Peripheral blood smear taken from a patient with microangiopathic hemolytic anemia, illustrating the presence of fragmented red cells.

The opinions expressed herein are those of the authors and cannot be construed as reflecting those of the Navy or of the Naval service at large.

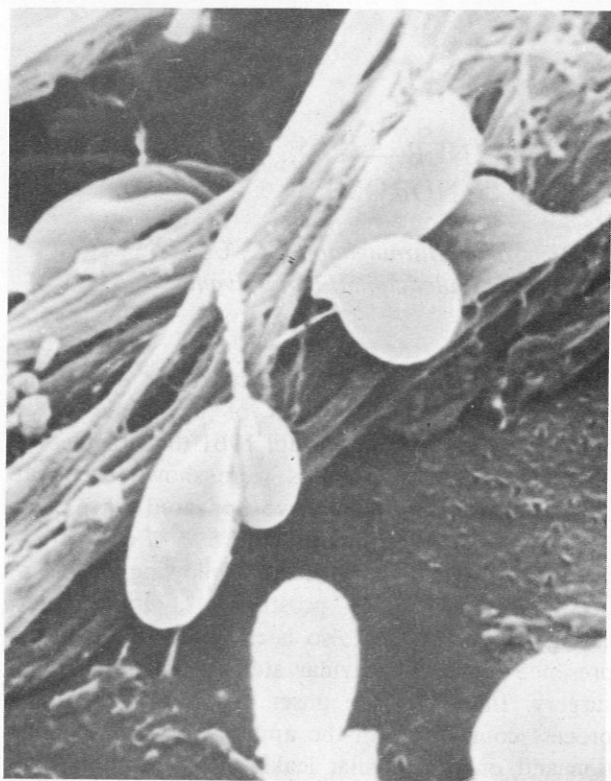


Fig. 2. Scanning electron micrograph shows entrapment of red cells by strands of fibrin. (From "The Production of Schistocytes by Fibrin Strands [A Scanning Electron Microscope Study]" by B. S. Bull and I. N. Kuhn; *Blood* 35: 104-111, 1970. Reprinted here by permission of the authors and Grune & Stratton, Inc.)

acterized by the following findings: 1) the characteristic peripheral blood findings noted above associated with a normal platelet count; 2) intravascular hemolysis, manifested by reticulocytosis, decreased plasma haptoglobin accompanied by the appearance of plasma hemoglobin and methemalbumin, and hemosiderinuria; 3) negative antiglobulin (Coombs' test); 4) elevation of the LDH Isoenzyme I + II level—this has been suggested as a convenient and reliable means of following the intensity of the hemolytic process¹⁰; 5) decreased red blood cell survival times (Cr^{51} labeling method), and; 6) iron and folic acid deficiency—the former occurs secondary to prolonged loss of iron via the urinary tract and the latter via chronic hemolysis and utilization of the body's stores in attempt to compensate for the anemia. The mechanism of hemolysis seems to be due to shearing stresses imposed upon the erythrocyte in its passage through a malfunctioning prosthesis. Clinically, it has been noted that the severity of the anemia is proportional to the severity of the fragmentation, and the degree of physical activity in which the patient is

engaged¹¹. Before replacement of the prosthetic valve is undertaken, a trial of medical therapy is recommended in order to reduce the severity of fragmentation. Therapeutic measures include iron and folic acid supplements, restriction of activity, digitalis, and diuretics as needed. If compensation is not achieved by these means, or if anemia worsens progressively, then reoperation and replacement of the prosthesis seems to be the only remaining alternative.

In contrast to this situation, the presence of the fragmentation process with associated thrombocytopenia is the hallmark of the microangiopathic hemolytic anemias (MHA). The criteria proposed by Linton¹² for making this diagnosis include: 1) fragmented erythrocytes in the peripheral blood, 2) anemia, 3) reticulocytosis, 4) leukocytosis, 5) thrombocytopenia, and 6) presence of fibrin degradation products in serum. Additional features which are characteristic of MHA are a negative antiglobulin test, and all of the laboratory features of intravascular hemolysis noted previously. All these are constant findings in MHA from whatever cause.

In 1962, M.C. Brain and his associates published what is now considered to be the "classic" work on this disease entity¹³. In that paper, it was suggested that small vessel disease, usually of an occlusive nature and designated "microangiopathic", was responsible for the fragmentation of the erythrocytes. It was speculated that the characteristic red cell distortion and fragmentation may well be due to direct contact between the patient's red cells or transfused red cells and the necrotic or otherwise altered intima of small blood vessels. They also noted that the severity of the anemia was in direct proportion to the severity of the fragmentation and the severity of the fragmentation was in direct proportion to the severity of the microangiopathic process. The hemolytic anemia and thrombocytopenia reflected distortion of the red cells at the site of damaged small vessels, as well as removal of platelets from the circulating blood at these same sites.

In 1968 Brain and his group published a series of papers that gave further impetus to their conclusions of 1962^{14, 15}. Defibrination was induced experimentally in rabbits, and there followed the appearance of fibrin microthrombi in the microvasculature. Shortly thereafter red cell fragmentation and its associated findings appeared in the blood. An experimental *in vitro* system using a blood pumping chamber was designed. This confirmed the concept that defibrination, in association with microthrombi, was regularly associated with fragmentation and evidence for

intravascular hemolysis. Finally fibrinogen catabolism¹⁶ was studied in patients with MHA, and was found to be accelerated. This latter finding is equated with an acceleration of the coagulation mechanism, and is found for example in disseminated intravascular coagulation. Taking all their data and findings together, Dr. Brain and his group concluded that the process common to diseases associated with MHA is accelerated intravascular coagulation, leading to thrombocytopenia and the formation of fibrin microthrombi. Fragmentation occurs when red cells traverse the fibrin meshwork, where distortion and tearing of the cell membrane takes place. Only two factors are essential to the genesis of the fragmentation process, viz., a rapidly moving stream of blood, and an obstruction to blood flow with dimensions which are small relative to the size of the erythrocyte.

More recently, Bull has used the technique of scanning electron microscopy to demonstrate the process of fragmentation¹⁷. His elegant photomicrographs show the trapping of erythrocytes within the fibrin mesh in the microvasculature, and their subsequent distortion and tearing (Fig. 2).

The pathogenesis of fragmentation has been well worked out, but the mechanisms which activate the clotting mechanism to form small vessel thrombi are not completely understood. A variety of processes are known to accelerate clotting: arteritis, severe allergic reactions, generalized sepsis, and profound intravascular hemolysis; but the role played by any or all of these in MHA is unclear.

Heparin, because of its multiple effects on the clotting system, is recommended as the mainstay for treatment of MHA^{3, 18}. Blood transfusions, steroids and/or ACTH, and hemodialysis have all been used, and except for the hemolytic-uremic syndrome of childhood, the results have been disappointing because of failure to resolve the microangiopathy and fragmentation. Splenectomy has been performed in thrombotic thrombocytopenic purpura with some success recently¹⁹, but the results cannot be applied to any of the other diseases with MHA. The vagaries of therapy reflect the uncertainties underlying the activation of coagulation.

In summary, fragmentation of red cells occurs when impediments to blood flow appear within the circulation. Such impediments subject the erythrocyte

to large shearing stresses, and result in the formation of red cell fragments and "schistocytes". In the absence of thrombocytopenia, fragmentation usually is due to mechanical obstruction in the macrocirculation. The presence of thrombocytopenia indicates a microangiopathy, which can be due to any one of a number of factors, and which is treated with variable success.

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EYE CORRECTION POSES PROBLEMS

By *CAPT G. W. Werner, MSC, USN** and *CAPT A. Bartolomei, MSC, USN***

In the past ten years, the Navy has purchased 10 million pairs of eyeglasses to correct various eye deficiencies. This investment, plus the time and services of the ophthalmologists, optometrists, and technicians concerned, constitutes a sizeable dollar figure in medical care costs.

Despite this large expenditure, there are problem areas in eye correction that have not been alleviated, especially in the fleet. We have several hundred thousand Mark V protective masks in the fleet without a single pair of adequate corrective lenses. When a fire occurred aboard the USS Oriskany several years ago, 480 Oxygen Breathing Apparatus devices were used to combat damage and save lives. We have no eye correction devices for the OBA. We have M-24 protective masks for pilots, with only poor eye corrective devices. A new rescue breathing device is soon to be introduced in the fleet called "SCOBFA," but there is no corrective eye device. The man must wear his regular glasses, and this is deemed unacceptable.

What constitutes "combat ineffectiveness" in the military is a most controversial subject. To define "combat ineffectiveness," one has to define the man's specific position and duties. Regarding eye correction, it has been established that for across-the-board planning, any man whose vision is 20/60 or less needs eye correction to be "combat effective." This figure, however, may need to be restated as "corrected to 20/20," depending on his required tasks. Navigators, dial readers, or other specialists where visual acuity is a prime performance factor, comprise a priority group for immediate visual correction.

A recent survey of the fleet conducted by the Naval Weapons Laboratory at Dahlgren, Va., indicated that 22% of Navy personnel now have visual acuity of 20/60 or less. One can readily understand the need for a large number of pairs of glasses for eye correction, and it is apparent that we are not completely on top of the problem.

BUMED has not been negligent in the mask eye-correction area. Over the past five years, several meetings have been held. Various bureaus, systems commands, and laboratories that have responsibilities in the personnel protection area have studied the problems, but solutions have not been easy.

In a recent meeting of BUMED, Naval Ships Engineering Center, the Naval Research Laboratory, Washington, D.C., and the Naval Weapons Laboratory, Dahlgren, Va., eye correction for protective devices was discussed at great length. A mask to replace the Mark V protective mask is being designed. Concurrent with the construction of this new design, will be the development of eye corrective devices by the Naval Ophthalmic Support and Training Activity, at Williamsburg, Va. under the management of the Optometry Branch of BUMED. Eye corrective devices for any special protective device now existing or being developed will also be studied so that no man in the Navy or Marine Corps will be "combat ineffective" due to a lack of eye correction.

The task is enormous and much time has already been lost. Greater effort and research funds are necessary to find solutions. We can no longer ignore or program around people who need corrective lenses. If a device cannot contain corrective lenses, then a new device with adaptable corrective lenses must be designed and developed expeditiously.

The new agreement to reach these goals as soon as is practicable and provide the Navy with the necessary equipment to do the job, is a step in the right direction. ☸

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RELATIVE PREDICTABILITY OF OCCUPATIONAL GROUPS AND PERFORMANCE CRITERIA IN AN EXTREME ENVIRONMENT*

Richard E. Doll, E. K. Eric Gunderson and David H. Ryman, Navy Medical Neuropsychiatric Research Unit, San Diego, Calif. *J Clin Psychol* 25(4):399-402, October 1969.

Introduction

Prediction of personnel performance in industrial or military settings tends to be difficult even within stable and well-defined organizational structures. Whether actuarial or clinical methods are employed, predictive validities tend to be low, and cross-validities often are insignificant. The need for valid personnel selection devices remains, however, and development of useful selection models is an urgent concern of many professional psychologists. For several years, the Navy has conducted predictive studies of adjustment in one type of extreme environment, that of small Antarctic stations. These data may provide tentative insights into problems of personnel selection for other unusual environments.

Recent developments in personnel assessment have emphasized the need to consider and integrate many kinds of information about an individual and to define as clearly as possible the specific criterion behaviors to be predicted. Thus, multiple tests or predictor items and multiple criteria have become standard in personnel selection programs, yet often the final results remain at the global level, and development of specific sets of discriminating variables for predicting separate aspects or components of the desired performance is a rare occurrence. Such an omission is unfortunate because Ghiselli and others have clearly demonstrated that the reliability and validity of predictors frequently vary over groups or situations.

This study is concerned with the predictability of three Antarctic occupational groups on five performance measures utilizing a variety of predictor sources. The specificity of predictors for the various groups and criteria is evaluated; this type of analysis should aid in the development of conceptually meaningful differential predictors for this work setting.

In the present investigation, tests, clinical ratings, and performance evaluations were obtained for individuals in a variety of occupational specialties during four Antarctic expeditions.

Method

Subjects. Ss were 160 Navy enlisted men and 80 civilian scientists assigned to U.S. Antarctic stations for one year, all volunteers. Ss were grouped into three occupational categories for purposes of the study: Navy construction personnel ("Seabees"), Navy technical and administrative personnel, and scientists, that is, individuals responsible for carrying out projects in several scientific disciplines.

Procedure. Ss filled out biographical, personality, and attitude inventories as part of a routine psychiatric screening program for eligible Antarctic volunteers. Each applicant also was interviewed and rated independently by a psychologist and a psychiatrist. Performance measures consisting of supervisor ratings and peer nominations were obtained on two occasions during the year of duty in Antarctica, early in the period of winter isolation and again near the end of winter isolation approximately six months later.

Each occupational group was subdivided into two equal-sized ($N=40$) samples for cross-validation purposes. Ss composing the samples were matched on year, station, occupational specialty, and education. Pearson correlations were computed between predictor variables and criteria for each of the six samples. Using a method described by Baker, probability values for each pair of correlations (original and cross-validation) were combined into a single statement of *compound probability*. This method had an advantage similar to that of experiment replication in that it required a predictor-criterion relationship to show up reasonably well in two independent observations before it was accepted as being significant.

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A compound probability confidence level of .05 was established as a test for significance of relationship between predictor and criterion. The percentage of significant compound probabilities was then determined for each predictor source over the three groups and the five criteria. From these percentages, it was possible to compare the relative predictability of the various occupational groups and performance criteria, separately, and in combination, in terms of the several predictor sources utilized.

Predictor Variables. A large number of predictor items and scores were categorized into five predictor sources. The content of these predictor sources can be characterized as follows:

1. *Personality Scales.* These were 26 scales which included the six scales of Schutz's FIRO-B Inventory and 20 scales developed especially for Antarctic screening.

2. *Clinical Evaluations.* Independent ratings made by psychologists and psychiatrists were combined to provide scores on 16 personality traits and adjustment predictions. The reliabilities of these trait ratings and their validities for a global performance criterion have been reported elsewhere.

3. *Opinion Survey Items.* These were 76 attitude and personality self-description statements rated on 6-point scales ("strongly agree" to "strongly disagree").

4. *Hobbies.* Responses to a list of 19 hobbies and avocational activities were scored as positive, negative, or neutral depending upon the attitudes expressed. In addition to 38 independent response categories, two scores representing total positive or negative responses were included as variables.

5. *Personal History.* This predictor source included 21 variables derived from factual information pertaining to family background, religious interests, marital status, education, delinquency history, and military status and experience.

Performance Criteria. Criterion scores were based upon independent ratings by two station leaders on a set of behavior traits and peer nominations on the same or comparable traits. The five criteria and the items utilized were as follows:

1. *Emotional Stability*—"emotional stability" and "acceptance of authority" (supervisors); "calm and even-tempered" (peers).

2. *Task Motivation*—"industriousness," "motivation" and "proficiency" (supervisors); "industrious and hard-working" (peers).

3. *Social Compatibility*—"likability," "cheerfulness," and "considerate of others" (supervisors); "friendly and popular" (peers).

4. *Leadership Ability*—"leadership ability" (supervisors); "provides leadership" (peers).

5. *Overall Performance*—all items above (supervisors); "select to winter-over with again" (peers).

The development of these criterion measures, their reliabilities, and convergent and discriminant validities, are described in a previous report.

Results

Results for each predictor source are considered separately. Percentages of significant compound probabilities are shown in Table 1 for all combinations of predictor source, criterion, and group.

The wide variation in percentages among the different three-way combinations was indicative of the relevancy (or irrelevancy) of the prediction sources for certain criteria and/or occupational groups. For example, it was apparent that clinical ratings were an appropriate source for prediction of Leadership within the Technical-Administrative group (68.7%) but were of questionable merit for prediction of Emotional Stability (0%), Social Compatibility (0%), and Overall Performance (0%) within the same group.

By collapsing Table 1 on one or two factors, it was possible to compare the percentage of significant compound probabilities for the remaining factor(s). Thus, when the occupational groups were combined, Emotional Stability tended to be predictable from the Hobbies source (20.0%) for the total group while Task Performance was negligibly related to this source (6.7%).

In the case where the criteria were collapsed, the results showed that the Technical group was most predictable from all predictor sources except Personal History; scientists were slightly more predictable using this source. Moreover, it was found that the Seabees were least predictable from all sources except Opinion Survey Items.

Considering all predictor sources together, the best criterion-group combination for prediction was that of Emotional Stability and Technical group (17.9%). On the other hand, the least effective combination was Task Motivation and Seabees (5.0%).

The final phase of the analysis called for combining two factors simultaneously to determine the predictability of the third. In the first case, the predictor sources and criteria were combined in order to com-

PREDICTABILITY OF OCCUPATIONAL GROUPS AND PERFORMANCE CRITERIA

TABLE 1.—Percent of Significant Compound Probabilities by Predictor Source, Criterion, and Occupational Group

Criterion	Predictor Source				
	Personality Scales	Clinical Evaluations	Opinion Survey	Hobbies	Personal History
<i>Emotion</i>	(P = 26) ^a	(P = 16)	(P = 76)	(P = 40)	(P = 21)
Group 1 ^b	11.5	6.2	5.2	7.5	0.0
Group 2	23.0	0.0	15.7	27.5	14.2
Group 3	11.5	31.3	5.2	25.0	14.2
<i>Task</i>					
Group 1	7.6	0.0	5.2	2.5	9.5
Group 2	7.6	6.2	14.4	7.5	14.2
Group 3	11.5	0.0	2.6	12.5	9.5
<i>Social</i>					
Group 1	7.6	12.5	12.9	7.5	14.2
Group 2	19.2	0.0	18.4	12.5	4.7
Group 3	7.6	37.5	7.8	12.5	9.5
<i>Leader</i>					
Group 1	15.3	31.3	10.4	5.0	14.2
Group 2	3.8	68.7	7.8	20.0	14.2
Group 3	15.3	0.0	10.4	12.5	9.5
<i>Overall</i>					
Group 1	7.6	6.2	7.8	2.5	0.0
Group 2	26.9	0.0	19.7	17.5	4.7
Group 3	15.3	0.0	10.4	10.0	19.0

^a P is the number of compound probability statements involved.

^b Group 1 — Navy Seabees (Construction)
Group 2 — Navy Technical and Administrative
Group 3 — Scientists

pare the percent of significant compound probabilities for the occupational groups. The results showed that the Technical-Administrative group had the highest percentage (15.2%) and the Seabees had the lowest percentage (8.0%) of significant probabilities. Using the method described by Lawshe and Baker, *t*-tests were computed for significance of differences between these percentages. The differences in predictability between the three groups were all significant at the .05 level, and in the Technical-Administrative vs. Seabees comparison, the difference was significant at the .01 level. In the second instance where predictor sources and groups were collapsed, Leadership was the most predictable criterion (12.7%) and the Task Motivation was the least predictable criterion (8.0%). Examination of the significance of the differences between the percentages for the five criteria revealed Task Motivation to be significantly less predictable than Leadership ($p < .01$), Emotional Stability ($p < .05$), and Social Compatibility ($p < .05$). No other comparisons were significant at the .05 level.

To be certain that any differences in percentages of significant compound probabilities were not simply a function of differences in criterion variance among the occupational groups, the means and standard deviations of the criterion scores were com-

puted for each occupational group. The findings clearly indicated that a condition of homoscedasticity existed.

Discussion

The prediction of performance or adjustment in any situation requires adequate measurement of the desired behavior or criterion and identification of relevant characteristics of applicants. Personnel selection studies have most frequently used personal history data, interviewer evaluations, and attitude or personality inventories as predictors, and typically each item or score is correlated with a global performance criterion. The most highly correlated variables are then utilized to predict performance in another sample. These procedures have often been criticized for being grossly empirical and for ignoring possible explanatory concepts which might lead to useful hypotheses and generalizations.

The method of analysis used in the present study provided useful information in the search to identify conceptually meaningful predictors for varied work roles in extreme environments. The findings strongly suggest a definite specificity in the relevance of various predictor sources for different criteria and occupational groups.

(Continued on p. 56)

HYDRONEPHROSIS FROM SHELL FRAGMENT IN RENAL PELVIS

John W. Wescott, MD,* *Milit Med* 134(11):1334-1335, October 1969.

Foreign bodies causing obstruction to the outflow of urine are uncommon, and metallic fragments from external violence, which act as a ball-valve obstruction in the renal pelvis or ureter with hydronephrosis, are extremely rare.

In a recent extensive review of the literature, Bretland and Blackclock reported on foreign bodies in the kidney and ureter. They found 66 cases in the world literature, to date. The majority of these entered the urinary tract by direct penetration; of the 66 cases, 23 were from bullet or grenade fragments which involved the urinary tract by external violence; 17 cases involved foreign bodies which migrated from the gut (e.g. fishbones or toothpicks from the duodenum or colon); seven were from retrograde migration of unusual objects from the bladder up the ureter; and 11 cases involved foreign bodies which represented accidentally or deliberately deposited drains or tubes from a previous surgical procedure.

In 1937 Magoun reported the only other case of a hydronephrosis due to a ball-valve obstruction from a bullet lying in the renal pelvis. His patient was a 59 year old female who had been shot with a .38 calibre pistol; 17 years later she developed dysuria, with frequency and right renal colic. With urographic and retrograde studies, a tiny calculus was seen in the lower right ureter, and the intact bullet was seen in the right renal pelvis, with an accompanying grade two hydronephrosis. A nephrectomy was performed.

Because of the rather bizarre rarity of the lesion, this case report is added to the literature.

Report of a Case

A 38 year old civilian communications engineer was working in the field in Vietnam when he was wounded by mortar fragments on 1 November 1966. He sustained injuries to his left flank and abdomen. He was operated on at a Saigon field hospital, where a through-and-through penetrating injury of the colon was repaired, and a right transverse loop co-

lostomy was performed. The left kidney was explored through the same incision. There was a wound of entry into the left kidney; a large metallic fragment was palpated, and was felt to have lodged in the renal parenchyma. There was no active bleeding, and the renal tissue was not badly lacerated. A Penrose drain was left in the flank for several days. The post-operative course was uneventful, and a follow-up urogram on 12 November 1966 showed prompt bilateral function, with a foreign body in the left kidney. No calyceal abnormalities were seen. The patient was transferred to the US Naval Hospital, Philadelphia, for further care, arriving on 17 November. His past medical history revealed that, approximately two months prior to his injury, he had spontaneously passed a small calculus, after an episode of typical left-sided renal colic; unfortunately, the stone was not recovered. He had a lumbar laminectomy in 1957 for a herniated nucleus pulposus, from which there were no sequelae. His systems review was negative.

Physical findings on admission. The patient was a well-developed, well-nourished Caucasian male, in no distress. The vital signs revealed BP 120/80, R 16, P 80, T 98.6F. The entire physical examination was normal, with the exception of the transverse colostomy and a drain site in the left abdominal wall, which was draining yellow, slightly purulent material. Laboratory tests included a urinalysis which showed 5-6 rbc/hpf and 8-10 wbc/hpf on microscopic examination of the urinary sediment. The complete blood count, chest film, urine culture, EKG, blood urea nitrogen, and sedimentation rates were normal; three determinations of serum uric acid, calcium and phosphorus were all within the normal range.

Course in Hospital. Five days after admission, the patient developed typical signs of severe left renal colic, with radiation of pain into the left testis. A plain film of the abdomen revealed numerous metallic fragments in the left flank opposite the second lumbar vertebra, with one large foreign body in the region of the renal pelvis. Excretion films on the urogram and a subsequent bulb retrograde uretero-

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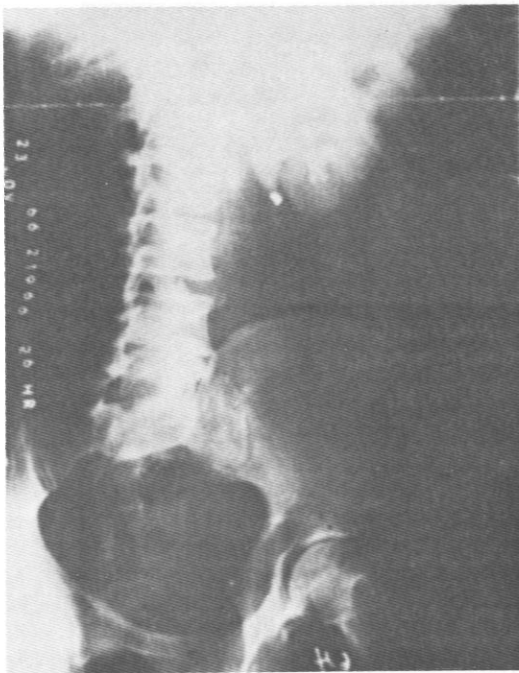


Fig. 1. Excretory urogram five days after admission showing the presence of a metallic fragment at the left ureteropelvic junction.

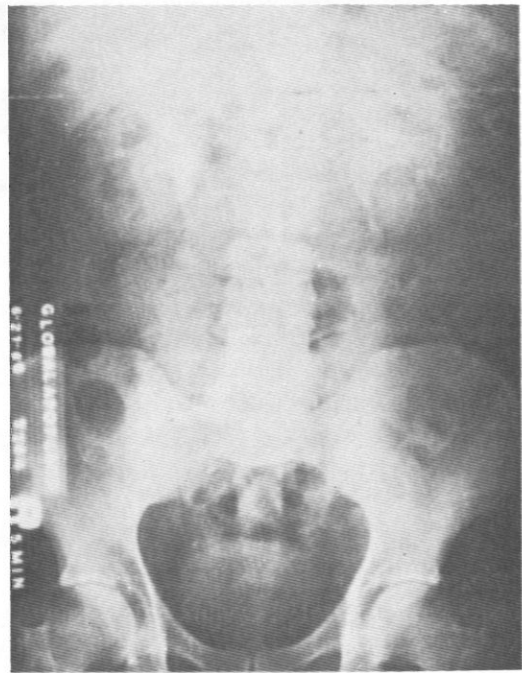


Fig. 2. Excretory urogram seven months after operation revealed no abnormalities.

pyelogram, confirmed the presence of a mortar fragment lodged in the ureteropelvic junction (Fig. 1). The patient had intermittent episodes of colicky pain, and two days later he was taken to the operating room. Through a flank approach to the left kidney, the metallic fragment was removed, using a small pyelotomy incision. Postoperatively, there was very little drainage, and a Penrose drain in the flank was mobilized the following day, and was removed on the fifth postoperative day. One month later, the patient had a closure of his colostomy, and he was discharged from the hospital on 9 January 1967. He was asymptomatic, and the urine was sterile; he was receiving no antibiotics at this time.

A follow-up urogram, one month after surgery, was normal. The patient returned to Vietnam shortly thereafter, where he was awarded the Purple Heart. To our knowledge, he is the only civilian so honored in Vietnam. He has continued to be asymptomatic, with a sterile urine, and an excretory urogram performed in Saigon in June 1968 showed no abnormalities (Fig. 2).

Discussion

Several points may be raised from a review of this case and other missile injuries to the urinary tract.

First, this case is somewhat unusual in that the onset of symptoms from the ureteral obstruction occurred quite soon after injury. In the majority of cases, there is a silent period varying from months to years, the average being approximately nine years.

Secondly, most of the foreign bodies become associated with calculus formation, particularly those associated with a long period of quiescence. The most characteristic mode of presentation is an attack of renal colic, though many cases simply have frequency and dysuria.

The typical pattern then, after a missile wound of the kidney, is for the foreign body to lie silently in the parenchyma, gradually working its way into the collecting system, where it eventually produces symptoms, either through infection or colic.

Summary

A case is described of a man who sustained a mortar fragment wound of the left flank, the foreign body lodging in the renal parenchyma. The metal fragment eroded into the renal pelvis, and subsequently produced colic, by obstructing the ureteropelvic junction.

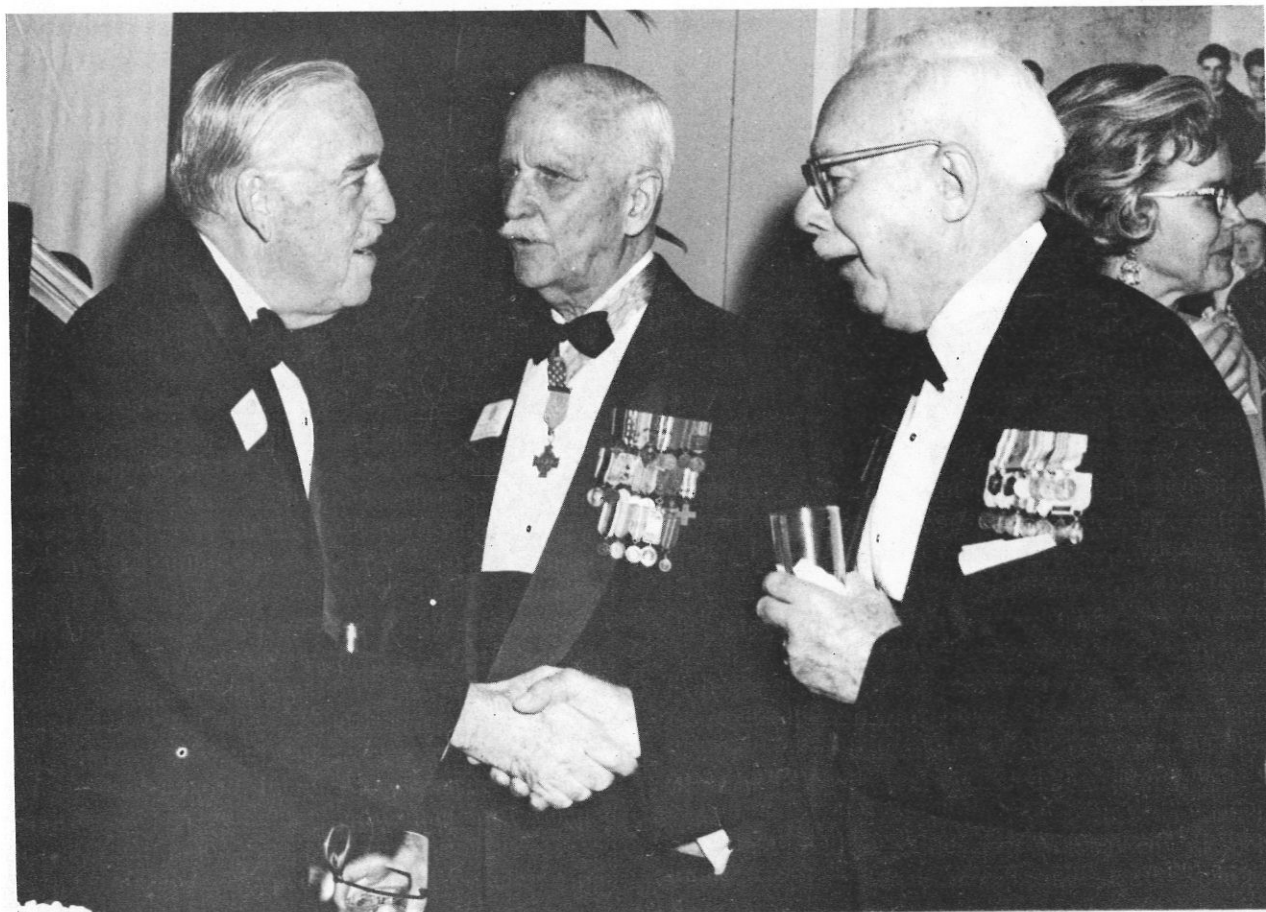
(The references may be seen in the original article.)



On 3 March 1970, the NAVY MEDICAL CORPS held its first official birthday celebration, on its 99th year. These photos reflect the observance of that momentous occasion at medical facilities and stations throughout the world.



VADM G. M. Davis, MC, USN, Surgeon General, cuts cake at NNMC, Bethesda, Md.



RADM B. W. Hogan, MC, USN (Ret), a previous Surgeon General (left); VADM Joel T. Boone, MC, USN (Ret) (center); and RADM H. L. Pugh, MC, USN (Ret), a previous Surgeon General (right) at NNMC.



CAPT Kaess, MC, USN (right) with LT Wilson, MC, USNR (left) at Nav Hosp Subic Bay, Philippines.



CAPT Geib, MC, USN cuts cake at USNH, Yokosuka, Japan, with CDR Coil looking on.



RADM H. P. Mahin, MC, USN (center) with LT F. Bishop, MC, USN (right) and CAPT H. Hubbard, MC, USN (left) in uniform worn for dress occasions by MC officers 50 years ago, at Nav Hosp Oakland, Calif.



CAPT J. A. Long, MC, USN (center) with LT D. E. Corbit, MC, USNR (left) and LT W. T. Yates, MC, USNR (right) at Nav Hosp Portsmouth, N.H.



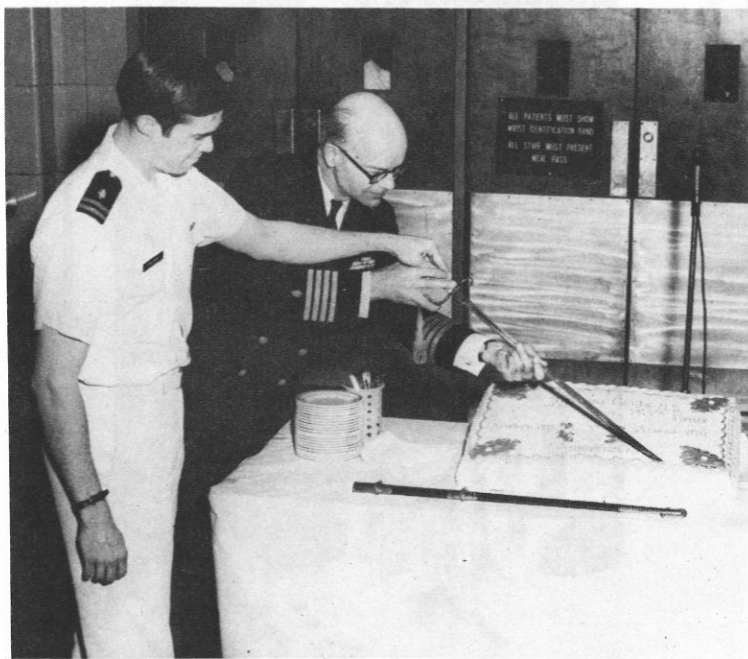
CAPT H. A. Baker, MC, USN (right) and CAPT P. C. Gregg, MC, USN (left) at Nav Hosp Corpus Christi, Tex.



CAPT W. F. Hansen, MC, USN (right) at the cake cutting ceremony of NAMRU-2, Taipei, Taiwan, with Lu, Hsi-Chao, RADM of Chinese Navy, Surgeon General (center) and CAPT R. H. Watten, MC, USN.



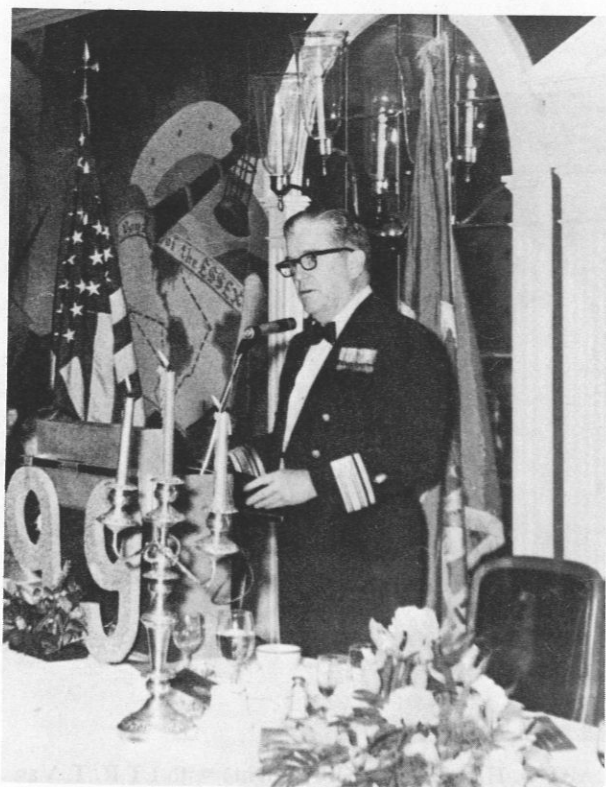
LTGEN L. J. Fields, USMC (left) with CDR J. R. Lukas, MC, USN (right) at Nav Hosp Quantico, Va.



CAPT G. H. Tarr, MC, USN (right) with LT R. T. Van Uden, MC, USN (left) at Nav Hosp St. Albans, N.Y.



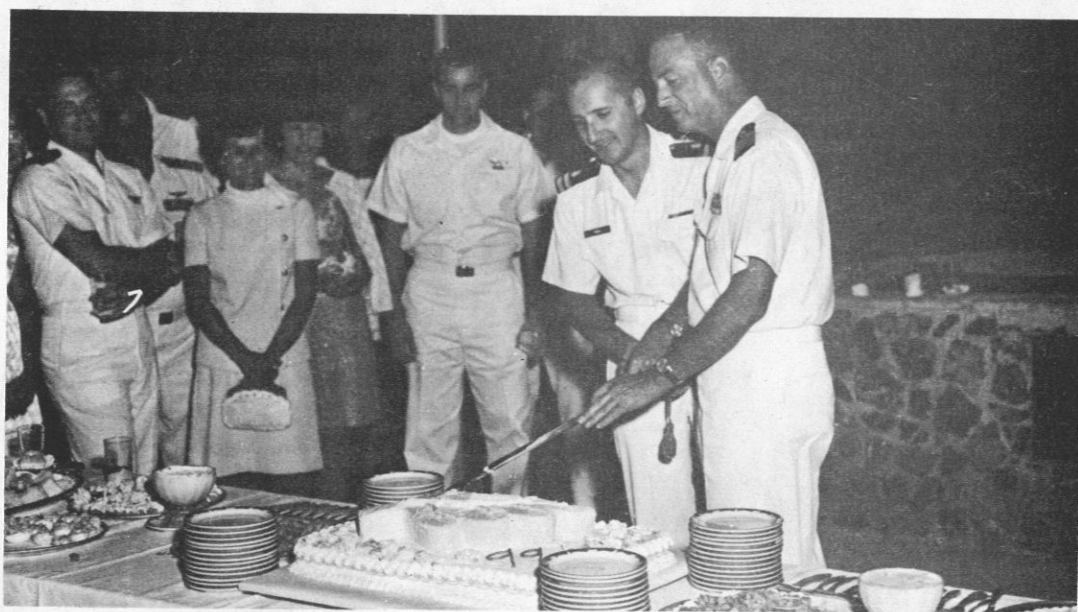
CAPT B. B. Barnhill, MC, USN (center) with LT J. Millwater, MC, USN (left) and LT Dale Peterson at USNH Guam, M. I.



RADM J. Yon, MC, USN at Nav Hosp Portsmouth, Va.



RADM J. L. Holland, MC, USN (Ret) (left) with RADM E. P. Irons, MC, USN (right) (now retired) at Naval Aerospace Medical Center, Pensacola, Fla.



CAPT A. C. Hering, MC, USN (extreme right) with LT D. J. Koza, MC, USNR at Nav Hosp Guantanamo Bay, Cuba.

On 3 March 1971, the NAVY MEDICAL CORPS will celebrate its 100th birthday. We are privileged to participate in this "once in a lifetime" event. Where will you be? Please send pics. ☺

PRODROMATA IN ACUTE MYOCARDIAL INFARCTION

Henry A. Solomon, MD, Adrian L. Edwards, MD, and Thomas Killip, MD,
Circulation XL(4):463-471, October, 1969, by permission of the American
Heart Association, Inc.

Summary

One hundred patients admitted to a coronary care unit with acute myocardial infarction were interviewed from a structured questionnaire to evaluate the incidence and significance of prodromal symptoms. Prodromata occurred in 65% of the subjects; this is the highest incidence ever recorded. Chest pain was the most common symptom. Characteristically it was recurrent and progressive. Patients with prodromata in contrast to those without warning are more likely to have an anterior or anterolateral infarction and the damage is more likely to be non-transmural than transmural. Prodromata have a striking relationship to pre-existing angina. Patients with angina rarely are hospitalized for acute infarction without warning. Emotional stress was not correlated with the definitive attack of cardiac infarction but was associated with the development of prodromata in some patients. These observations suggest that acute myocardial infarction is usually the culmination of a dynamic pre-coronary process.

Recent quickening of interest in the identification and treatment of patients with myocardial infarction prior to hospitalization emphasizes the importance of accurately categorizing a pre-coronary state. Although it is now known that some patients have multiple episodes of pain prior to clinical recognition of an acute infarct, prodromal symptoms received only sporadic mention in the clinical literature during the early part of this century. In the late 1930's, several observers called attention to the possible importance of prodromata. Despite speculation that prodromata are frequent, however, few data concerning this important occurrence have been accumulated. Estimates of the incidence of prodromata have ranged from 15 to 50%.

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This study was supported by Contract PH-43-67-1434 and Cardiovascular Training Grant 5 T12-HEO 5789-02 from the National Institutes of Health, U.S. Public Health Service.

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The present study is designed to evaluate the prevalence of prodromata in patients admitted to the hospital with a definitive diagnosis of acute myocardial infarction and to compare certain clinical findings in patients with and without historical evidence of prodromata.

Description of Study

One hundred and forty-four patients were admitted consecutively to the Coronary Care Unit of The New York Hospital during the period of study from November 1967 to July 1968. One hundred and twenty-three patients with presumed acute myocardial infarction were interviewed in detail by one of the authors within 4 to 24 hours of admission. Twenty-one patients were not interviewed for various reasons including coma, sudden death, language barrier, or a diagnosis on admission other than myocardial infarction. In 23 patients the admission diagnosis of acute myocardial infarction was not substantiated.

One hundred patients proved to have myocardial infarction and are the subjects of this study. The diagnosis of myocardial infarction was based upon appropriate history, abnormal electrocardiograms, and abnormal levels of enzyme activity. In 98 of the 100 patients, careful history revealed a moment prior to hospitalization, recognized as distinct by the patient, when the definitive clinical attack of infarction was presumed to have begun. The average delay between the onset of symptoms of the definitive attack of cardiac infarction and admission to the hospital, which does not have an ambulance service, was 8.0 hours with a median value of 3.5 hours. Since the present study relates only to hospitalized patients, no information is available concerning subjects who may have died before reaching the hospital.

A prepared, standardized questionnaire was used. Frequent consultations among the interviewers insured that each subject was questioned in a similar manner. In no instance did the interview procedure

interfere with management of the patient, nor were any untoward effects of the interviews observed. The patients had received sedative or narcotic medication earlier but all were considered alert at the time of interview. Twenty-five controls, consisting of patients of approximately the same mean age, hospitalized for a variety of reasons and without evidence of coronary artery disease, were also interviewed for symptoms suggesting prodromata. In this study prodromata are defined as a constellation of new symptoms of presumed cardiac origin, or worsening of existing cardiac symptoms, which precede acute myocardial infarction by a period not exceeding 2 months.

Results of Study

Incidence of Prodromata

The incidence of prodromata was extraordinarily high. Sixty-five of the 100 patients with acute myocardial infarction gave a history on detailed questioning of symptoms preceding the acute definitive episode. The average age of patients with prodromata was 60 years, compared with 64 years for patients without prodromata. One patient with prodromata was Negro; all others in the study were Caucasian.

None of the 25 control patients gave a history of prodromata.

Analysis of Prodromata

Pain was the dominant prodromal symptom, occurring with or without other symptoms in 59 patients (91% of those with prodromata) and absent in only six patients (9%).

In 47 patients (72% of those with prodromata) pain was the sole prodromal symptom. In 12 patients (18%) pain was associated with other symptoms. These included: dyspnea, diaphoresis, and lightheadedness. In six patients (9%) pain was absent and pre-coronary symptoms included burning in the chest, dyspnea, vertigo, weakness, and fatigue.

Prodromata were recurrent in 56 patients (86%). Only nine patients (14%) had a single prodromal episode. Of the 56 patients with recurrent prodromal symptoms, 43 (77%) experienced a progressive or crescendo syndrome consisting of increasing frequency, severity, or duration of prodromal attacks before culminating in acute myocardial infarction.

The duration of the prodromal syndrome varied greatly. The shortest interval between the onset of prodromata and the occurrence of the definitive attack of acute myocardial infarction was 14 hours;

the longest was 2 months. In only one patient did prodromal symptoms develop in less than 24 hours. In 10 patients (15% of those with prodromata) symptoms anteceded acute infarction by 1 to 6 days; in 36 (55%) by 1 to 3 weeks; and in 18 (28%) by more than 3 weeks.

Recurrent prodromal attacks for an individual were generally similar in duration; only 12 subjects (18% of those with prodromata) experienced significant variability in duration of their prodromal attacks, while 53 (82%) had episodes of rather constant duration.

Among different patients, however, the duration of the prodromal episodes varied considerably. In 37 patients (57%), no episode exceeded 15 minutes. In 10 (15%), at least one prodromal attack lasted up to 30 minutes. Four (6%) experienced at least one attack lasting up to an hour. Fourteen (22%) had prodromal episodes of greater than 1 hour's duration.

In 41 patients (63%), prodromal episodes occurred only in relation to physical activity or emotional tension. Nineteen patients (29%) experienced prodromata only at rest. Five patients (8%) had prodromata both at rest and with activity.

In Summary

Pain was the predominant and usually the only prodromal symptom. It was commonly recurrent. Characteristically the attacks were progressive or crescendo. Duration was variable in different patients, but usually similar in a given patient.

Electrocardiographic Localization of Infarction

Analysis of the electrocardiographic location of the infarction revealed that in the total series of 100 patients, 48 had anterior or anterolateral infarctions. In 52 patients the location was "other" including diaphragmatic, 36; anterodiaphragmatic, seven; indeterminate, four; posterior, four; and subendocardial, one.

The location of the infarction differed significantly in patients with prodromata compared to those without prodromata. The infarction was anterior or anterolateral in 62% and "other" in 38% of the patients with prodromata and was anterior or anterolateral in only 23% and "other" in 77% of the patients without prodromata. This difference is highly significant ($P < 0.001$). Furthermore, 83% of the 48 patients in the total series with anterior or anterolateral infarctions had prodromata. Only 48% of patients with other electrocardiographic localization

experienced premonitory symptoms. These differences are highly significant ($P < 0.001$).

Thus the patient with prodromata has two out of three chances of having an anterior infarction. The patient with an anterior infarction has a greater than 80% chance of having prodromata.

Angina Pectoris

A history of pre-existing angina correlated with the occurrence of prodromata. In the total series, 41% of the patients with acute myocardial infarction had a history of angina pectoris. Prodromata in these subjects consisted of alterations of their anginal syndromes, recognized as different by the patients, including intensification of attacks, development of new symptoms, and increased frequency and duration of anginal episodes. Of the 65 patients with prodromata, 34 (52%) had angina pectoris, while 31 (48%) did not. Of the 35 patients without prodromata, however, only seven (20%) had pre-existing angina pectoris, while 28 (80%) did not. These differences are significant ($P < 0.005$). Moreover, 83% of all patients with preexisting angina pectoris had prodromata preceding acute myocardial infarction, while only 53% of patients without angina experienced prodromata ($P < 0.005$).

Thus, preexisting angina pectoris predisposes to the occurrence of prodromata. To state the proposition another way: the patient with angina is not usually hospitalized for myocardial infarction without warning. According to our data he has a better than 80% chance of developing prodromata prior to a new infarction.

Transmural Infarction

The incidence of prodromata correlated with the extent of myocardial damage. There were 59 instances of transmural infarction as determined by the presence of pathologic Q waves on the electrocardiogram in our series. Of the 65 patients in the series with prodromata, 33 (51%) had transmural infarction, whereas among all the patients without prodromata, 26 (74%) had transmural infarction ($P < 0.025$). Of the 59 patients with transmural infarction, 33 (56%) had prodromata. In contrast, among the 41 patients without transmural infarction, 32 (78%) had prodromata ($P < 0.025$). Thus, prodromata are more common in patients with nontransmural infarction.

The difference in incidence of prodromata between patients with transmural and nontransmural infarctions was not due to the distribution of such

infarcts between anterior and "other" locations. Our data reveal that 25 (42%) of the 59 patients with transmural infarction had anterior or anterolateral infarctions, while 34 (58%) had other electrocardiographic localization. Twenty-three (56%) of the 41 patients with nontransmural infarction had anterior or anterolateral infarctions, and 18 (44%) had other localization. These differences were not statistically significant.

Stress and Activity Related to Prodromata and Acute Myocardial Infarction

Of the total of 100 patients with acute myocardial infarction, 24 claimed to be subject to some sort of unusual stress during all or part of the three weeks prior to infarction. In 21 of these 24, the stress was predominantly emotional, involving business, personal affairs, or unrelated illness; in three it was physical. In four patients the stress occurred within 12 hours of infarction, in one patient it was between 12 and 24 hours, and in one it lasted for the full 24 hours preceding the definitive attack. In 18 patients, the unusual stress persisted for a longer time, from more than 24 hours to as long as 3 weeks before the definitive attack.

Twenty-one of the 24 patients (88%) who gave a history of unusual stress experienced prodromata while three (12%) did not. Of all patients with prodromata, 21 (32%) reported pre-infarction stress, compared to only three (8.5%) of patients without prodromata. These differences were significant ($P < 0.02$).

There was no significant difference between patients with and without prodromata with regard to activity at the time of the definitive attack of infarction. Twenty-three patients were either asleep or resting in bed, 70 were engaged in usual activity, and five were engaged in unusual activity. Two patients did not have a clearly definable clinical onset for the infarction.

Associated Pathophysiologic Conditions

Of various other conditions associated with coronary artery disease, we considered as significant a definitive history, or evidence of, diabetes mellitus, hypertension, peripheral vascular disease, or hypercholesterolemia. Thirty-three per cent of the patients in our total series had one or more of these conditions. In this group of 33 patients, the incidence of prodromata was 79% (26 patients), compared to an incidence of 58% (39 patients) in the 67 patients without one or more associated conditions

($P < 0.05$). One or more of these conditions occurred in 40% (26 patients) of those with prodromata. They were found in only 20% (seven patients) of those without prodromata ($P < 0.025$).

Sex Distribution

In the total series there were 76 males and 24 females. Among the males, the incidence of prodromata was 70%. It was 50% among female patients.

Of all patients with prodromata, 53 (82%) were male and 12 (18%) female. Of the patients without prodromata, 23 (66%) were male and 12 (34%) female ($P < 0.05$).

Other Factors

Analysis of the location and duration of symptoms of the definitive attack of acute myocardial infarction revealed no differences among patients with and those without prodromata. The frequencies of previous myocardial infarction, family history of cardiovascular disease, and history of smoking were similar among those with prodromal symptoms and those without.

Analysis of the hospital course failed to demonstrate significant differences in the incidence of heart failure, arrhythmia, shock, or mortality rate between the patients with and those without prodromata.

Discussion

The present study, based on an analysis of symptoms recalled shortly after hospitalization by 100 patients with proven myocardial infarction admitted to a coronary care unit, has revealed that two of three subjects had a clear-cut warning before the apparent definitive attack. This, to our knowledge, is the highest incidence ever recorded. It may be lower than actually present since denial is such a strong component of the defense mechanism when a patient is faced with acute illness.

The data also demonstrate that a discrete moment as the clinical onset of acute infarction can usually be identified from a careful review of the medical history. Furthermore, the recurrent, progressive symptoms which characterize prodromata were distinguished by the patients from their pre-existing angina. Identifying a discrete period as the clinical onset of an illness does not, of course, necessarily imply understanding of the pathophysiologic event. Information is not available to determine whether the clinical onset of myocardial infarction in man represents the moment when pathologic, metabolic, or electrocardiographic changes occur.

While provocative, the present observations apply only to a circumscribed sample of the population at risk for myocardial infarction. This study encompasses only patients who survived to be admitted to a teaching hospital which lacks an ambulance service. It is now recognized that more than 50% of patients with acute myocardial infarction do not survive to reach a hospital. Further inquiries are needed to determine whether our findings are applicable to the general population at risk for myocardial infarction.

The present study provides no information regarding the incidence of subsequent cardiac infarction in all patients who develop prodromata. We have no data on patients who develop a prodromal syndrome but do not progress to clinical infarction. In view of the striking association between angina pectoris and prodromata, it would be useful to study a population with angina to determine the incidence of prodromata or change in patterns of angina. Since the majority of instances of sudden death probably represent an expression of coronary artery disease, it would be important to determine whether patients who die suddenly have had prodromata. Obviously, further data from prospective studies of high risk populations are necessary before the significance of the prodromal syndrome can be fully realized.

Feil, in 1937, reported that in approximately 50% of patients with acute myocardial infarction the attack is preceded by premonitory chest pain. Sampson and Eliaser recorded the incidence of prodromata to be 48%. Maurice and associates noted that 39% of patients with myocardial infarction have symptoms from several hours to a month or more before the definitive attack. Wood stated that 45% of individuals with acute myocardial infarction had prodromal symptoms. Mounsey reported the incidence to be 29%. Vakil recognized premonitory symptoms in 39% of patients. Behrmann and coworkers stated that 16% of acute infarctions were preceded by premonitory warning. Yater's group found that 10% of men under 40 years of age with myocardial infarction had prodromal symptoms within 3 weeks of the infarction and that 49% had some symptoms which preceded infarction by more than 3 weeks.

Many factors may account for the wide range of incidence of prodromata reported in acute myocardial infarction, including errors inherent in drawing conclusions from small groups of patients, variability in diagnostic criteria, and sampling from different populations. Most likely, however, the differences are a reflection of the methods of study. Most of the earlier data were derived from retrospective

analysis of records transcribed by a variety of observers who were not aware of, or seeking specific information concerning prodromata. In our own study, many instances were encountered in which an unequivocal history of prodromata was obtained, but this information had not been elicited by the admitting physician.

Chest pain is by far the most common prodromal symptom. We found, unlike prior authors, that the pain in most instances appears rather typical of ischemic cardiac pain, being described usually as squeezing, tightening, pressure, or heaviness in the chest. Unusual pain syndromes were uncommon. Prodromata to acute cardiac infarction are generally repetitive and progressive or crescendo. This dynamic aspect has been noted only once previously.

The correlation between anterior or anterolateral infarction and prodromata has not previously been recognized. Among the 11 patients with prodromata reported by Feil, in whom electrocardiographic localization of the infarct was possible, eight had anterior or antero-apical infarctions. The significance of the relationship between prodromata and the location of infarction is not entirely clear, but differences in the pattern of blood flow in vessels supplying various parts of the myocardium may provide an explanation. In posterior or diaphragmatic infarctions, areas usually served by branches from the right coronary artery, prodromata are uncommon. Anterior and antero-lateral infarctions generally reflect involvement of the anterior descending coronary artery.

The pattern of blood flow in the left and right coronary arterial systems is different, and flow per gram of myocardium in the right coronary artery is about one half that in the left. Many factors may account for variations in coronary blood flow, including the more extensive branching of the left coronary system, angulation of the left anterior descending artery during systole, higher tension in the left ventricle than in the right, and the tendency for more severe obstruction to occur in the left coronary system.

The possibility that the postero-diaphragmatic surface of the heart is less sensitive to pain than the anterior surface should be considered as an alternative explanation for the relationship between the electrocardiogram and prodromata. Yanowitz and associates have shown that although sympathetic innervation of the ventricles from the right and left stellate ganglia overlap, the influence of the left stellate ganglion is predominant over the posterior wall of the ventricles, while right stellate influence dominates the

anterior ventricular walls. Whether sensory innervation is similarly divided is unknown, and whether alternations in sensory nerve tone indeed exist, as have been postulated for the sympathetic responses of the individual stellate ganglion, is purely speculative.

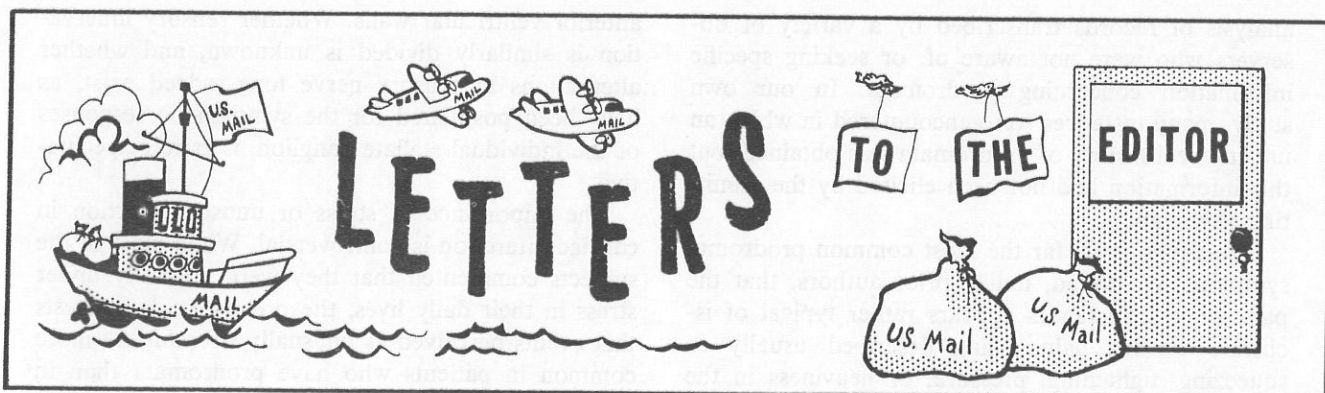
The importance of stress or unusual exertion in cardiac infarction is controversial. While most of the subjects commented that they were normally under stress in their daily lives, the present study suggests that events perceived as unusually stressful are more common in patients who have prodromata than in those who do not. We have no information to evaluate the question whether patients who reported increasing stress and prodromata were indeed subjected to greater forces than usual or rather had changes in their perception of what was stressful.

Emotional stress or unusual activity could not be related to the definitive clinical episode of acute cardiac infarction in our series. Twenty-three per cent of the patients were in bed, 70% were engaged in usual activity, and only 5% were participating in unusual activity at the time of the infarction. The low incidence of stress at the time of the acute attack is similar to the finding of Master and associates but is in contrast to the observations of others who have noted a significant relationship between unusual activity and acute infarction.

The overall incidence of angina pectoris in our series, 41%, is comparable to earlier reports. Eighty-three per cent of all patients with pre-existing angina in our series had prodromata. In contrast in patients without angina the incidence of sudden infarction without prodromata was approximately equal to that of infarction preceded by prodromata. The implication is clear: change in the pattern of established angina should be viewed with grave suspicion. Changes recognized by the patient consist of increased frequency, severity or duration of pain episodes, or development of new symptoms.

Patients with angina pectoris usually have diffuse coronary artery disease. The striking association between angina and prodromata suggests that circulatory factors may be important in the development of the latter. Presumably prodromata are manifestations of hypoxia. Hypoxia is a major stimulus for the development of collateral coronary circulation. Extensive collaterals may limit the extent of ventricular necrosis when infarction occurs. Our data indicate that patients without prodromata more commonly have transmural infarction. Such lesions may well be

(Continued on p. 22)



To the Editor: RADM Albritten's article on drug abuse (November 1970) was certainly one of the finest I have read. This article should be given wide distribution in the Navy. As he stated, drug abuse is of as much concern to the Division officer as it is to the Doctor.

I also noted your article on beards for Food Service personnel; this was timely. As the Food Service Officer aboard the USS FORRESTAL, this is a hotly discussed item. My view concurs with your article, however many people feel that a man should not be penalized from growing a beard simply because he is assigned to the Food Service Division for duty. I strongly urge BUMED to get out firm policy on this item.

This was my first opportunity to read your publication. I admit some of it was over my head, however, other than the professional items for Medical personnel only, I think it is an outstanding magazine for anyone involved with personnel or sanitation.

LT J. L. Conner, SC, USN
Food Service Officer
USS Forrestal CVA-59

The following letter was addressed to the Bureau of Medicine and Surgery. It was a personal letter not intended for any other purpose by the author. Considerable interest was generated in processing this "routine" correspondence, however, because of its sincere and unusual nature. Dr. Haddad expressed surprise and pleasure when permission to publish his letter was requested by the Surgeon General in a reply. Through the courtesy of the author, we are proud to present this refreshing comment on military service by an exceptional physician.

To the Editor: You often hear from doctors who go in for 2 years to fulfill their military obligation that it was a "waste of time" or "like being in jail,"

or "two years cut off their life"—it was two years they could have spent completing their residency.

I was ComEastFor medical officer from Aug 1968 to June of 1970, and under both Admiral Ed King and Admiral Marmaduke G. Bayne, it proved for me an invaluable experience. I was responsible for approximately 50-100 families, and about 500-1000 sailors in a remote region. I learned two things which I would never learn in a residency—and things which are invaluable to a young physician.

First, I learned the practical aspects of being a physician. An intern or resident can treat shock, gram-negative sepsis, or do a tracheostomy as a life saving procedure, but he doesn't know the first thing about handling an hysterical mother; dealing with a superior who is an irresponsible alcoholic; or similar situations which do not require technical knowledge, but require finesse gained only by experience.

And second, where positions are well delineated in the Navy, I learned the physician's role in the community—one never knows this in the protected halls of the university.

This letter is my way of saying thanks to you—to Admiral King, Admiral Bayne, and to the U.S. Navy, for an invaluable two years of my life.

Sincerely,
Lester M. Haddad, M.D.
4912 Brandywine Street, N.W.
Washington, D.C. 20016.

To the Editor: The November 1970 issue of U.S. Navy Medicine points out in a short note that microwave and R-F radiations may have an adverse effect on cardiac pacemakers. While this warning is certainly pertinent and timely, it does tend to cast a somewhat slanted perspective on the problem. At a time when so much concern is being expressed as to the possible hazards of non-ionizing radiations and

(Continued on p. 45)

HEARING ACUITY AND EXPOSURE TO PATROL AIRCRAFT NOISE

William R. Pierson and Charles I. Barron, Human Engineering and Medical Departments, Lockheed-California Company, Burbank, California 91503. Aerospace Med 40(10): 1099-1101, October 1969.

The audiograms of aviators with long-time exposures to high intensity, low frequency noise of maritime patrol aircraft were compared with those of persons not having been so exposed. The results of the clinical and statistical evaluations indicated no permanent effects on hearing which might be attributed to patrol aircraft noise.

For many years the noise generated by piston engines has been considered a hazard to airmen and long-range maritime aircraft have been singled out as being particularly hazardous in this respect. The possibility of permanent hearing loss from such exposure is of interest not only to flight surgeons but to the operators of military and commercial air carriers because it can interfere with in-flight communication, degrade aural signal detection, and lead to premature separation of highly trained personnel.

It was the purpose of this study to determine the hearing acuity of airmen associated with long and intensive exposures to patrol aircraft noise.

Procedure

The Lockheed Orion (P-3A and B) was selected as the paradigm for current long-range maritime aircraft because it is a four engined turbo-prop aircraft capable of long duration missions, has been in Fleet inventory long enough for airmen to have accumulated a considerable number of in-flight hours, and data could be made available from a large enough sample for meaningful inferences. Hearing acuity was evaluated from the results of pure-tone audiometry, and the audiograms were plotted to ASA 1951 values. In the statistical analyses no difference was accepted as significant unless the probability of its chance occurrence was five percent or less.

Subjects—The data were obtained from active duty U.S. Navy personnel assigned flight duty with squadrons employing P-3 series aircraft and from a

control group of persons applying for initial employment with the Lockheed-California Company. The active duty personnel were considered in two groups: flight engineers, who are exposed to APU (auxiliary power unit) noise during the pre-flight checkout, and multi-tour aircrew members other than flight engineer.

Two sets of audiograms for each of ten flight engineers were provided by the squadron flight surgeon. These were the earliest and latest available and the mean time between audiograms was 24.8 months (s.d.=14.4). The total flying hours per individual was 930 (s.d.=516) with 878 hours (s.d.=469) in P-3 aircraft. Ages and medical histories of these subjects were not available.

The thirteen multi-tour aircrew members represented all flight and crew stations except flight engineer and their mean age was 27.6 years (s.d.=3.7) with a mean service time of 7.2 years (s.d.=3.4). The total number of flying hours per individual was 2,488 (s.d.=1,208) with 1,597 hours (s.d.=480) in P-3s. None had less than 1,000 hours in this aircraft. According to their statements, none of the subjects wore in-flight ear protection other than standard headphones. Audiograms, ear examinations, and histories were conducted at the medical facilities of the Lockheed-California Company, but not until the subjects had been away from the flight line for a minimum of 36 hours.

The control group consisted of the first 50 male applicants for employment during the study period and audiograms, ear examinations, and histories are routinely part of the pre-employment physical examination. Four of the subjects were eliminated from the analyses because of age and the mean age of the remainder was 32.2 years (s.d.=9.5). There was no significant difference in ages between the control and multi-tour subjects ($t=1.70$). No applicants with flight-line experience were found in the control group

although a broad range of work experience, from design through manufacturing, was represented.

Results

The mean hearing losses for each of the three groups are presented in Figure 1 and the modal scores, which are not subject to the attenuating effects of single very poor scores, are presented as Table I. Because of the basic assumptions underlying audiogram scales, both parametric and nonparametric analyses were conducted. The results of the Analysis of Variance for the 18 column scores (6 frequencies for each of the three groups) indicated statistically significant differences ($F=7.08$ for left ear audiograms and $F=3.08$ for right ear with 17 and 194 d.f. each). An examination of Figure 1 indicates that the significant F might be explained by: (1) the scores of the multi-tour airmen being better in all frequencies than those of the other groups, (2) hearing loss for all groups being greater in the higher frequencies (3,000–6,000 Hz), or (3) hearing loss not being the same for all groups in all frequencies. The first of these was discounted when the results of the Wilcoxon matched-pairs signed-ranks test revealed no differences among the groups when the scores for all frequencies were lumped together. Tukey's procedure revealed no significant gap between any two adjacent means when they were rearranged by rank, indicating no break (e.g., 4,000 Hz "notch") in the audiograms for either ear. The hearing losses in the "speech average" range (500, 1,000 and 2,000 Hz) were not different among groups or frequencies ($F=1.70$ for left ear audiograms and $F=0.50$ for right, with 2 and 33 d.f. each), implying that the differences noted in the 18 column scores might be due to the fact that the groups are not homogeneous in the higher frequencies. This was substantiated by the Wilcoxon test which revealed that the multi-tour airmen had better hearing in the 3,000–6,000 Hz range than the other subjects. In this frequency range the flight engineers did not differ from the control group.

Modal Scores—The mode is the most frequently appearing score in a series of scores and under certain conditions may be more representative of the sample than the mean score. Modal scores for the data (Table I) were subjected to a nonparametric test, the Friedman Two-Way Analysis of Variance, and the results indicated that the differences among the three groups were not statistically significant ($\chi^2_r=2.55$ and 1.72 for left and right ear audiograms, respectively).

TABLE I. MODAL SCORES OF AUDIOGRAMS

	Frequency (In Hz)					
	500	1,000	2,000	3,000	4,000	6,000
Control Group (N=46)						
Mode (Left Ear, in dB)	-10	-10	-10	10	0	0
(Right Ear, in dB)	-5	-5	-10	0	0	0
Multi-Tour Airmen (N=13)						
Mode (Left Ear, in dB)	-10	-10	-10	-10	0	-10
(Right Ear, in dB)	-10	-10	-10	-5	0	0
Flight Engineers (N=10)						
Mode (Left Ear, in dB)	-5	-10	-10	5	5	0
(Right Ear, in dB)	-5	-10	-10	0	0	0

Note: Minus scores indicate better than normal (0 dB) hearing.

Changes in Audiograms—The results of periodic audiometry for the flight engineers were made available and the mean scores of "earliest" and "latest" audiograms are presented as Table II. In this table it should be noted that changes in a "minus" direction indicate an improvement in hearing acuity, i.e., less hearing loss. The greatest changes occurred in the 4,000 Hz tone and were in the direction of an improvement in hearing. However, the magnitude of the change was not such as to indicate any difference

TABLE II. MEAN CHANGES IN AUDIOGRAMS
(FLIGHT ENGINEERS N=10)

	Frequency (In Hz)					
	500	1,000	2,000	3,000	4,000	6,000
Left Ear (in dB).						
First Audiogram	-2	-3	6	8	22	18
Latest Audiogram*	-6	-5	1	11	16	22
Change	-4	-2	-5	3	-6	4
Right Ear (in dB)						
First Audiogram	-2	-5	2	9	18	16
Latest Audiogram*	-5	-6	1	9	9	18
Change	-3	-1	-1	0	-9	2

*Average time between first and latest audiogram=24.8 months.

Note. A minus change indicates an improvement in hearing.

in the audiograms which could not be attributed to chance ($t=0.6$ for left ear and 0.7 for right ear). Differences between the two audiograms in frequencies other than $4,000$ Hz were not evaluated because it is unlikely that they would be statistically significant when the greatest change was not.

Clinical Evaluation—At the time of the audiometry, clinical ear examinations and histories were taken. For the control group, these were conducted by qualified medical personnel and by qualified flight surgeons for all other subjects. No evidence of disease or abnormality was observed.

Discussion

From the results of the clinical and statistical analyses, and for the population represented by the sample, it may be inferred that the noise of maritime patrol aircraft has no permanent deleterious effect on the hearing of flying personnel for exposures of approximately $2,500$ flight and associated preflight hours. Kipp examined flying personnel who had accumulated thousands of hours in multi-engine aircraft with high noise intensity at low frequencies. For those with $2,000$ to $12,000$ hours flying time he noted that the greatest hearing loss occurred in the range necessary for oral communication but that it was only after $2,000$ – $3,000$ flight hours that abnormalities in the audiogram occur with such regularity

that they may be attributed to aircraft noise. In the present study, four of the multi-tour subjects had $3,000$ or more total flying hours with two having logged in excess of $4,700$ hours. The hearing for these subjects in the "speech average" range (500 – $2,000$ Hz) was better than normal in all instances. Kipp's data were collected on wartime German Air Force personnel who had accumulated a great many hours in a very few years, whereas the subjects of the present study required some ten to twelve years to reach $4,000$ hours. There were undoubtedly longer rest periods between missions for the latter and the impairment caused by intense aircraft noise disappears completely if there is a sufficiently long recovery period.

A possibility which cannot be discounted is that the samples of both Kipp and the present study represent a select population with "noise resistant" ears, and that hearing loss eliminated the normal and susceptible persons before they could accrue many flying hours. However, it was not within the scope of the present study to evaluate this hypothesis.

ACKNOWLEDGMENT

The authors wish to express their appreciation to W. E. Evans, III, MD, and Lt D. A. Turner, MC, USNR, for their kind cooperation and assistance in this study.

(The figure and references may be seen in the original article.)

(Continued from p. 42)

when pressure is great to place even more severe restrictions on the use of generating devices, it would appear ill-conceived to present a distorted view of this particular problem.

While it is true that the effects reported in the J.A.M.A. letter were observed, it should be noted that in only one case was this a fortuitous occurrence. The remaining 3 cases were intentionally exposed to a different microwave oven. Although ECG artifacts were noted, it was only in a particular model pacemaker that activity could be effectively blocked. It should further be noted that microwave and R-F radiation are not the only extraneous sources of pacemaker interference. Household electrical appliances, power tools, gasoline engine ignitions, in fact almost any device which may produce an electrical field or discharge may affect pacemaker function. Of further significance is the fact that this effect varies between different model pacemakers.

I would suggest, therefore, that emphasis be placed not on eliminating sources of external interference nor on warning patients with pacemakers, both of which avenues are rather impractical, but rather that emphasis be placed on the development and use of a properly shielded pacemaker to eliminate extraneous interference. A device such as a German model presently available, which is encased in stainless steel, should be quite effective in this regard.

I would further suggest that as the Navy has a great deal at stake in the use of R-F and microwave radiation, perhaps it would behoove BUMED to support and encourage the development and use of a properly shielded pacemaker.

LCDR William C. Milroy, MC, USN
NROTCU, University of Rochester
Rochester, New York 14627



2.0 PPM OR 0.2 PPM???

Excerpted from the "Mike Flag," U.S. Navy Preventive Medicine Unit #7, Vol. XII, No. 4, 13 Nov 1970

A significant number of ships entering the Mediterranean area are apparently unaware of COMSIXTHFLT Instructions which require that all water obtained in foreign ports and of unknown or doubtful quality shall have a free chlorine residual of at least 2.0 ppm after 30 minutes contact time. "Water of unknown or doubtful quality" means *all* water taken on board in the Mediterranean. Water from evaporators is also required to be chlorinated and have a free chlorine residual of 2.0 ppm after 30 minutes contact time.

Some ships have experienced difficulty in maintaining a 2.0 ppm free chlorine residual in their water supply. Problems have ranged from "spotting" on clean dishes to clogged sounding tubes. The basis for these problems is the salts present in the calcium hypochlorite (chlorine). Make sure that the responsible personnel are aware of the proper procedures for mixing the calcium hypochlorite—mix the proper dosage in a container of slightly warm water and then allow the salts to settle. After several minutes, pour only the supernatant (clear portion) into the tank to be chlorinated. The residue of salts should be discarded.—Environmental Health Branch, Preventive Medicine Division, BUMED. ☸

FORMULARY NOTES

In response to a recent Talking Paper, a BUMED Formulary Review Committee has been established to examine hospital formularies and future formulary

changes. It became immediately apparent that development and maintenance of its own formulary by each individual hospital creates a prodigious workload. The resultant duplication and waste of effort are unacceptable. Equally undesirable would be Bureau imposition of a fixed formulary.

As an alternative, the Bureau will develop a flexible formulary which may be tailored and expanded by individual commands to satisfy local requirements. The program will require:

- Development of a fixed format for drug monographs.

- Preparation and printing of monographs for all drugs in standard stock and selected nonstandard items.

- Design and procurement of looseleaf covers.

The BUMED Formulary Review Committee (chaired by CAPT L. M. Fox, MC, USN, Chief of Medicine, Naval Hospital, Bethesda) will be assisted in development of the materials by a Formulary Working Group consisting of pharmacy officers from naval hospitals.

When these groups have completed the initial tasks, each naval hospital will be provided a listing of the printed monographs available. Hospital Pharmacy and Therapeutic Drug Committees can select those monographs desired, and can expand the range as necessary by using fixed format blank pages.

With these flexible formularies will be delivered machine listings of the requested monographs sorted by drug classification and therapeutic indication. Standardized appendices will be provided as appropriate.

Because of the magnitude of this unbudgeted program, a realistic availability date is late in 1972. ☸

NO₂-O₂ MATERIEL MISADVENTURE

A Nitrous Oxide tank pin-indexed for Oxygen—a Nitrous Oxide tank with a valve not pin-indexed—both items were discovered in the gas inventory of a naval hospital.

An article submitted for the "Clinical Workshop" section of Anesthesiology (A Variation of the NO₂-O₂ Theme, by CDR Clyde W. Jones, MC, USN, and HM1 Leon G. Violante, USN) reports the dangerous situation described above. The tanks were properly color-coded, and were charged with the gas indicated by that code. Investigation revealed that the contract supplier of gas, without realizing the significance of his actions, had replaced defective valves on a total of four tanks. Three replacement valves were pin-indexed for oxygen, and one was not indexed.

The potential for a tragedy is obvious, and fatal error was prevented only by the alertness of the anesthesiology staff at U.S. Naval Hospital, Guam. The incident serves to emphasize the professional attention to detail which is necessary to ensure the integrity of therapeutic or diagnostic systems.—Code 4A, BUMED. ☞

INCOME TAX—NAVY INTERNS AND RESIDENTS

With the impending deadline for filing 1970 income tax returns, the question will again arise in the minds of residents and interns as to whether or not the moneys received from the United States Government during the period of their training in naval hospitals on active duty is excludable from their taxable income. The right to exclude this income from taxable income for the year depends upon whether or not the payment is to further the education of the recipient or whether the primary purpose of payment is to serve the interest of the payor.

The income of a naval officer is governed by statute. The amount thereof depends upon his rank, length of service and number of dependents. It is paid to him whether he sees patients or not, although during his training period as both an intern and a resident he does see patients and functions as a physician in a naval hospital, even though he is receiving training in the process. He is not being paid because he is a resident or an intern, nor is he being paid for the purpose of furthering his education. The United States Government is payor of the funds to him as a naval officer, and because he is a doctor, reaps bene-

fits from his discharge of duty as a physician, since he treats patients which are entitled to medical treatment under federal law and regulations. Naval hospitals even though classed as teaching hospitals are nevertheless primarily engaged in treating patients, not training doctors, and thus utilize his capabilities in this connection.

There are many decided cases and Internal Revenue rulings which set forth these principles and deny the exclusion of salary and allowances paid under these circumstances.

Navy residents and interns on active duty should therefore not attempt to exclude the amount of their salary and allowances from their taxable income under the theory that the compensation received is in the nature of a scholarship or fellowship payment.—Code 11, BUMED. ☞

OCCUPATIONAL THERAPY TECHNICIANS, CERTIFICATION OF

For those who wish to seek employment as occupational therapy assistants following separation from the armed forces, certification may be obtained if certain criteria can be met. The American Occupational Therapy Association took action to make this possible in May 1970, recognizing that the Army, Navy, and Air Force have, or are currently conducting, formal training programs for occupational therapy personnel at the technical level which could be deemed comparable to those approved by the Association.

Application forms may be obtained by contacting:

Chief, Bureau of Medicine and Surgery
Navy Department
Washington, D.C. 20390
Attn: Code 34

or

The American Occupational Therapy
Association, Inc.
251 Park Avenue South
New York, New York 10010 ☞

18TH ANNUAL AFIP COURSE IN ORAL PATHOLOGY

This course provides dentists, physicians and trainees in oral and general pathology with a fundamental knowledge of various aspects of oral disease, and brings them abreast of recent developments in this field. It will be conducted 1-5 March, 1971, and

is presented by specialists in oral and general pathology, oral surgery, periodontics, dental research and cancer investigation.

Developmental disturbances of the head, neck and oral region, inflammatory diseases of the oral mucosa and jaws, the oral manifestation of certain systemic diseases, and neoplasms of the oral cavity and related structures are discussed in detail. Clinical, roentgenographic and microscopic characteristics are demonstrated. Lectures are correlated with case presentations and microscopic slide seminars. Lectures will be held at evening sessions.

The course is open to both civilian and military dentists and physicians. Early application is advised. To apply, contact The Director, Armed Forces Institute of Pathology, Attn: MEDEM-DE Washington, D.C. 20305. ☛

AMERICAN BOARD OF SURGERY EXAMS

The American Board of Surgery examined 1303 candidates in Part I of the examination in 1969. Of these, 1017 were examined for the first time, and 265 failed (26.1%). Graduates of U.S. and Canadian schools numbered 646, and 89 (13.8%) failed. Among 371 graduates of foreign schools, 176 (47.4%) candidates failed to pass the examination.

Two hundred and eighty-six candidates were reexamined in Part I in 1969, and 180 (62.9%) failed.

During the calendar year 1969, Part II examinations were given to 949 candidates, and 250 (26.3%) failed. Among the 765 candidates who were taking Part II for the first time, 527 were graduates of U.S. and Canadian schools, and 100 (19.0%) failed. In contrast, of the 238 graduates of foreign schools, 79 (33.2%) failed. In both instances, the failure rate was slightly increased over that for 1968.

This was the first year that more than 1000 candidates have taken Part I of the examination. In addition, for the first time since 1966, the number of first-time candidates who are graduates of U.S. and Canadian schools increased from 585 in 1968 to 646 in 1969. At the same time, the percentage of first-time candidates who were graduates of foreign medical schools decreased from 36.8% in 1968 to 36.5% in 1969.

The Part I examination continues to be given annually throughout the world in a variety of centers. In the past several years, Part II examinations have been given in ten medical centers in the United States, involving twelve teams of examiners for two days. In March 1969, a three-day examination was

conducted in a hotel, in an effort to reduce the demands made upon the active and senior members of the Board. The success of this examination has encouraged the Board, and, during 1970-71, six three-day examinations, and one two-day examination will be conducted. In addition, the Board has increased its membership by two men, who have been selected from the Society of University Surgeons.

The Board has been considering the structure of the Part I examination, with the cooperation of the National Board of Medical Examiners. This year, the Part I examination will be extended by three hours, and will include patient management problem questions, which have been used effectively in other Board examinations.

The American Board of Surgery has been cooperating with the Subcommittee on Examinations of the American Board of Medical Specialties. The Board, through its representative on this committee, has been participating in the development of a basic surgical examination. At the Annual Meeting of the Board, the following motion was carried by unanimous vote: "Be it moved that the American Board of Surgery enthusiastically supports the concept of a basic surgical education for all surgeons; that it supports and will participate in the development of an appropriate examination in basic surgery by the Surgical Council of the American Board of Medical Specialties; that the American Board of Surgery will require taking and passing this examination prior to certification at a time when four or more other surgical Boards also require passing this basic examination. It is also moved that this basic surgery examination be a discrete component and given at the time of Part I of the American Board of Surgery examination."

The Board, working in conjunction with the Conference Committee on Graduate Education in Surgery, has made a deliberate effort to stimulate experimentation in surgical education programs. This change in policy appears in the recently released Booklet of Information, which states: "The American Board of Surgery recognizes that the time required for the total educational experience which leads to Board certification should be that period sufficient to provide adequate clinical judgment and adequate technical skill. With appropriate educational content and planned program structure, a total of four years following medical school graduation might become acceptable for examination. The first year of such a program can be designated as a surgi-

cal internship and/or as a year of surgical residency. The American Board of Surgery will not give retro-active approval to candidates requesting the privilege of examination four years after graduation from medical school, unless the educational experience has been obtained in a program specifically approved for that purpose."☞

AMERICAN BOARD CERTIFICATIONS

American Board of Anesthesiology

LCDR Elmer F. Klein, Jr., MC, USN

American Board of Dermatology

LCDR Frank M. Crittenden, Jr., MC, USN
LCDR Warren G. Eyre, MC, USN
LCDR Robert E. Jordon, MC, USNR

American Board of Family Practice

CDR Eugene P. Walter, MC, USN

American Board of Internal Medicine

CDR Richard F. Schillaci, MC, USN
LCDR Jon B. Closson, MC, USN
LCDR Leon P. Georges, MC, USN
LCDR Francis C. Johnson, MC, USN
LCDR Carl G. Kardinal, MC, USN
LCDR Peter T. Kirchner, MC, USN

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American Board of Ophthalmology

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American Board of Preventive Medicine in the specialty of Aerospace Medicine

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American Board of Surgery

CDR William Gee, MC, USN
LCDR Joseph A. Bardenheier, III, MC, USNR
LCDR Marion R. Lawler, Jr., MC, USNR
LCDR Alan W. Robbins, MC, USNR

American Board of Thoracic Surgery

CDR Michael J. O'Sullivan, Jr., MC, USN☞

AWARDS AND HONORS

Legion of Merit

Alexander, P.C., CAPT, DC, USN
Anderson, V. L., CAPT, DC, USN
Chudzinski, J. G., CAPT, DC, USN
Pentecost, J. W., CAPT, DC, USN
Tenney, Benjamin, Jr., RADM, MC, USNR (Ret)

Bronze Star Medal

Birtcil, R. F., LT, DC, USN
Boothe, John P., HM2, USN
Doyle, Thomas J., HM2, USN
Lamarche, R. G., LCDR, DC, USN
Preston, Claude J., Jr., HM2, USN
Shankles, Melvin D., HM3, USN
Watkins, E. A., CDR, DC, USN

Meritorious Service Medal

Arm, Herbert G., CAPT, MSC, USN
Gibbs, Clarence J., Jr., CAPT, MSC, USNR
Hurst, Patricia, CDR, NC, USN
Rovelstad, Gordon H., CAPT, DC, USN
Wilson, Jay D., CAPT, MC, USN

Navy Commendation Medal

Barrow, P. E., CDR, DC, USN
Brenyo, M., CDR, DC, USN

Navy Commendation Medal (Con.)

Brown, Wendell P., HMC, USN
Clark, J. E., DTCS, USN
Flerlage, Lawrence B., HM3, USN
Gochicoa, A., DTCS, USN
Henderson, Charles Z., HM1, USN
Kaufman, Paul, CAPT, MC, USN
Kochevar, J. B., LT, DC, USN
Lawton, George M., CDR, MC, USN
Lekas, J. S., LCDR, DC, USN
McCallum, W. C., LCDR, DC, USN
Prince, R. D., CDR, DC, USN
Syrek, D. W., LT, DC, USN
Wirthlin, M. R., CDR, DC, USN

Navy Achievement Medal

Adlesich, L. L., DT1, USN
Brown, D. E., DT2, USN
Campbell, Robert E., LT, MSC, USN
Carroll, Jake R., LT., MSC, USN
Cohen, S., LT, DC, USN
Cole, R. H., DT2, USN
Denyer, Samuel M., HMCS, USN
DiBenedetto, F. G., DT3, USN
Donaldson, Iain G., HM2, USN
Dozier, N. K., LT, DC, USN
Faggioni, M. S., LT, DC, USN
Fischer, Peter, HM3, USN



Navy Achievement Medal (Con.)

Forbes, Casey H., HM1, USN
Gochicoa, A., DTCS, USN
Hale, William D., Jr., HM2, USN
Hurning, Thomas D., HM2, USN
Kahn, B. N., LT, DC, USN
LaSalle, Harry G., HMCM, USN
McAbee, Lee R., HM1, USN
Melvin, Perry D., HM3, USNR
Nettelhorst, R. B., LT, DC, USN
O'Brien, Kenneth F., HMC, USN
Ortman, W. N., LT, DC, USN
Paimejar, Luis Q., Jr., HM1, USN
Paullin, Wilbur G., HM1, USN
Setty, A. E., DTC, USN
Shepherd, James E., LTJG, MSC, USNR
Smertko, C. S., LT, DC, USN
Sullivan, R. A., DT1, USN
Szabo, J. F., DT1, USN
Trificana, R. M., LT, DC, USN
Zemacke, Matthew T., HM3, USN

Purple Heart

Davis, C. T., DT3, USN
McCallum, W. C., LCDR, DC, USN
Paxton, G. B., DT1, USN
Schultze, G. H., LT, DC, USNR

CDR Edward J. O'Shea, DC, USNR-R, Commanding Officer of Naval Reserve Dental Company 3-4, of Long Island, N.Y., accepts the first annual BUMED award for the "Most Outstanding Dental Reserve Company of the Year." The plaque award was presented by RADM John P. Arthur, DC, USN, Inspector General, Dental, at the Naval Reserve Symposium held in conjunction with the Annual Session of the American Dental Association, in Las Vegas, Nev., on 9 November 1970. Naval Reserve Dental Company 3-4 was awarded this plaque for its outstanding contributory support to the Regular Navy by participating in group active-duty-for-training, for two consecutive years at the Marine Corps Recruit Depot, Parris Island, S.C. in July 1969 and at the Naval Training Center, Great Lakes, Ill. in July 1970. The annual Plaque Award was donated to BUMED by CDR William J.H. Vaughn, DC, USNR-R, Commanding Officer, Naval Reserve Dental Company 8-5, of Dallas, Tex.

CAPT Walter N. Gallagher, DC, USN, District Dental Officer, 3rd Naval District (left) presents a Letter of Commendation from RADM Francis D.

Foley, USN, Commandant, Third Naval District, to RADM Samuel S. Wald, DC, USNR (Ret.) of New York, N.Y., for distinguished military service, at the



Naval Reserve Symposium held in conjunction with the Greater New York Dental Society Meeting on 7 Dec. 1970. RADM Wald was recognized for his

outstanding professional, clinical, and administrative support of the Naval Dental Corps during his many years of dedicated service in the Naval Reserve. 🍀

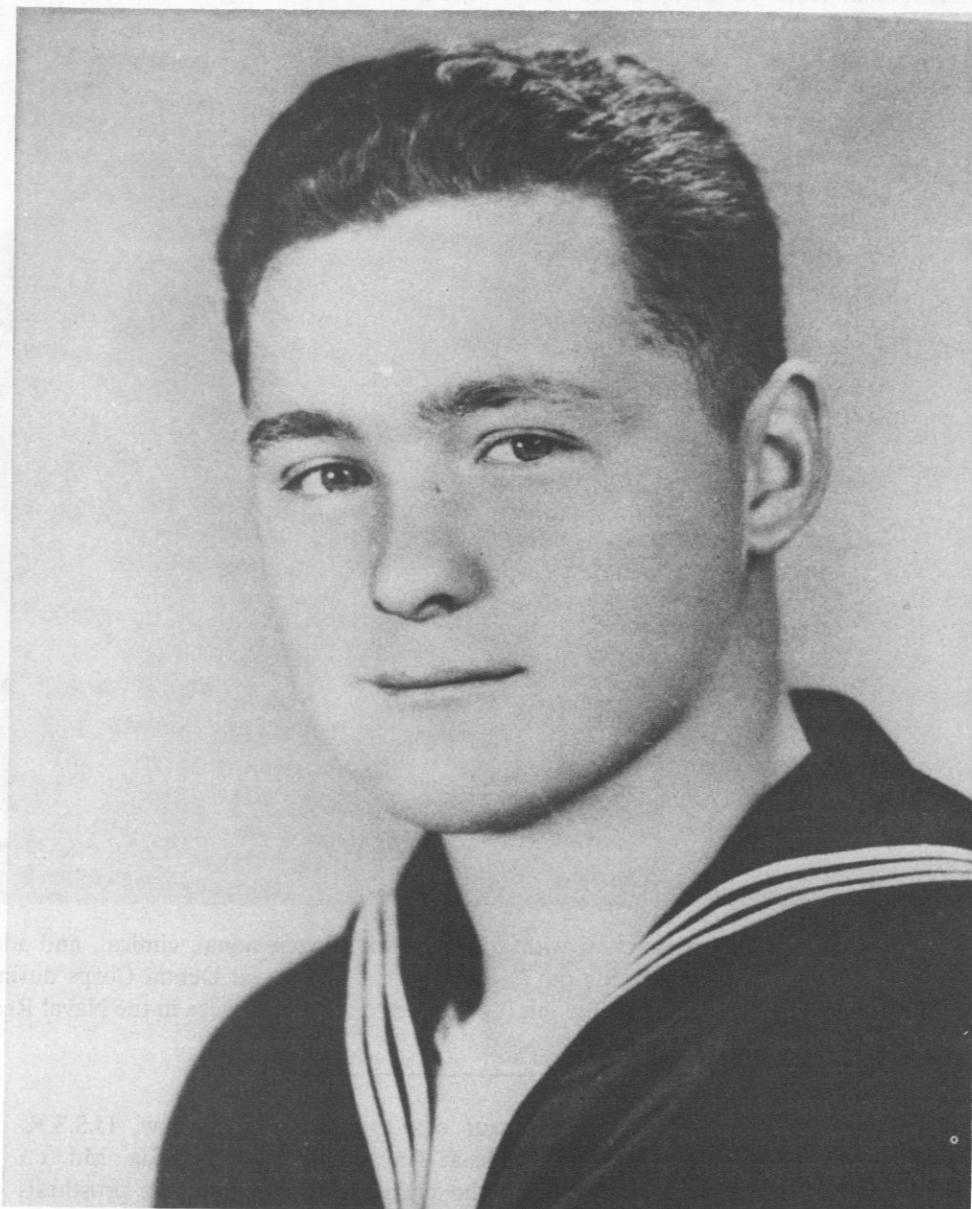
Professor Konstantin Sivasch, Professor of Orthopaedics, Moscow, U.S.S.R. attended the monthly Hip Problem Clinic at Naval Hospital, Bethesda, Md. on 18 December 1970. Professor Sivasch, who has developed a total hip prosthesis which bears his name, has been touring various hospital centers in the United States. 🍀

GENERAL WALT TO RETIRE

General Lewis W. Walt, Assistant Commandant of the Marine Corps since Jan. 1, 1968, is retiring Feb. 1.

President Nixon has nominated Lieutenant General Keith B. McCutcheon for appointment to the grade of General and successor to General Walt.

General McCutcheon has been Commanding General of the II Marine Amphibious Force in Vietnam. 🍀



HN Francis Colton Hammond was born in 1931 in Alexandria, Va.

While serving in the 1st Mar Div, Korea, on the night of 27 March 1953, Hammond's platoon was subjected to a murderous barrage of hostile mortar and artillery fire. A vicious assault by on-rushing enemy troops followed. Resolutely advancing through a veritable curtain of fire to aid his stricken comrades, Hammond, although critically wounded, valiantly continued to administer aid to the wounded throughout an exhausting 4-hour period. When the unit was ordered to withdraw, he skillfully directed the evacuation of casualties and remained in the area to assist the relieving hospital corpsmen until he was struck by an enemy mortar shell and fell, fatally wounded. He gallantly gave his life for his country.

USS FRANCIS HAMMOND (DE-1067) COMMISSIONED



USS Francis Hammond (DE-1067), a KNOX-class destroyer escort, was commissioned during ceremonies at Long Beach Naval Shipyard, Long Beach, Calif., on 25 July 1970. DE-1067 is the 11th in a series of new destroyer escorts designed primarily for anti-submarine warfare. The ship is named for Hospitalman Francis Colton Hammond of Alexandria, Va., who posthumously received the Medal of Honor for service with the 1st Marine Division in the Korea Conflict.

FRANCIS HAMMOND is powered by a single screw driven by a 35,000-shp steam turbine, with steam provided by two 1,200-pound boilers. DE-1067 will be capable of speeds in excess of 27 knots with a cruising radius of over 4,000 miles. The distilling plant will produce 24,000 gallons of fresh water daily for personnel use and for feeding the ship's boilers.

Principal speaker at the commissioning ceremonies was RADM Worth H. Bagley, Commander Cruiser-Destroyer-Flotilla Seven. The ship was sponsored by Mrs. Phyllis Hammond Smith, widow of Hospitalman Hammond. CDR John E. Elmore is the first Commanding Officer. The ship's complement consists of 14 officers and 210 enlisted men. ⚓



Left to right: SSGT Daniels, Marine Liaison, Naval Hospital, Quantico; CAPT Taylor, Commanding Officer, Naval Hospital, Quantico; Hospitalman Herbst; and Secretary of the Navy.

SEC NAV VISITS QUANTICO, VA.

The Secretary of the Navy, John H. Chafee, visited the Marine Corps Development and Education Command, Quantico, Va., on 10 November 1970 to witness the Marine Corps Pageant which is conducted annually in honor of the Marine Corps Birthday.

As a part of his visit to Quantico he accepted an invitation to tour the Naval Hospital and have lunch. The Secretary and Lieutenant General Raymond G. Davis, Commanding General, Marine Corps Development and Education Command, accompanied by Colonel W. H. Lanagan, USMC, arrived at the hospital about 1130 and toured the hospital. Staff corpsmen and patients acted as host for lunch for the Secretary and the Commanding General. A cake cutting ceremony was conducted in the dining room following the lunch with all staff and patients invited. The cake was cut by the Commanding Officer of the hospital, Captain George J. Taylor, III, MC, USN.



Left to right: CAPT Taylor, Commanding Officer, Naval Hospital, Quantico; Hospitalman Hood; Secretary Chafee; COL Lanagan, Marine Corps Aide to Secretary Chafee, and; CDR A. Williams, Chief Nursing Service, Nav Hosp, Quantico.



Left to right: Marine Cake Guard; CAPT Taylor, Commanding Officer, Naval Hospital, Quantico, and; Secretary Chafee.

PRISONER OF WAR FAMILY ASSISTANCE OFFICERS

All medical personnel are encouraged to do everything possible to ease the burden borne by the families of service members who are "missing in action" or prisoners of war. In order to provide special assist-

ance at each of our naval hospitals, the following officers at naval hospitals have been designated as Prisoner of War Family Assistance Officers for medical matters:

Naval Hospital

Annapolis, Md.
Beaufort, S.C.
Bethesda, Md.
Boston, Mass.
Bremerton, Wash.
Camp Lejeune, N.C.
Camp Pendleton, Calif.
Charleston, S.C.
Cherry Point, N.C.
Corpus Christi, Tex.
Great Lakes, Ill.
Jacksonville, Fla.
Key West, Fla.
LeMoore, Calif.
Long Beach, Calif.
Memphis, Tenn.
New London, Conn.
Newport, R.I.

POW Family Assistance Officer

LT L. N. Hilling, MSC, USN
CAPT M. D. Davis, MC, USN
LCDR A. Lovin, MSC, USN
LCDR B. A. Jones, Jr., MSC, USN
LCDR F. G. Conover, MSC, USN
LTJG P. T. Cox, MSC, USN
LCDR R. R. Bowden, MSC, USN
CDR R. Laedtke, MSC, USN
LCDR W. L. Weidner, MSC, USN
LT F. L. Windholz, MSC, USN
LCDR E. R. Nourigat, MSC, USN
CAPT R. R. Gillespy, MC, USN
LCDR G. E. Dailey, MSC, USN
LT J. D. Smith, MSC, USN
LTJG R. J. Chiri, MSC, USN
LCDR C. W. Null, MSC, USN
LTJG L. A. Rinard, MSC, USN
LT S. T. Fisher, MSC, USN

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(919) 346-2111 x4313
(714) 725-4605
(803) 743-4831
(919) 466-3934
(512) 939-2254
(312) 688-5685
(904) 772-2223
(305) 296-2461 x215
(209) 998-3692
(213) 421-4741 x384
(901) 872-1711 x596
(203) 449-3481
(401) 841-2471

Oakland, Calif.	LT A. O. Woods, MSC, USN	(514) 639-2041
Orlando, Fla.	LT A. D. Hatten, MSC, USN	(305) 646-5263
Patuxent River, Md.	LT J. D. Rausch, MSC, USN	(301) 863-3912
Pensacola, Fla.	LT R. G. Relinski, MSC, USN	(904) 452-3457
Philadelphia, Pa.	LT C. H. Hartman, MSC, USNR	(215) 755-8288
Port Hueneme, Calif.	CDR J. E. Howard, MSC, USN	(805) 982-4501
Portsmouth, N.H.	LT C. J. Gogel, MSC, USN	(603) 439-1000 x481
Portsmouth, Va.	LT W. Green, MSC, USN	(703) 397-6581 x516
Quantico, Va.	CDR W. L. Long, MSC, USN	(713) 640-2236
Quonset Point, R.I.	LTJG P. E. Dould, MSC, USN	(703) 267-3274
St. Albans, N.Y.	LCDR P. J. Kennedy, MSC, USN	(212) 526-1000 x208
San Diego, Calif.	LT D. E. Closson, MSC, USN	(714) 233-2946
Whidbey Island, Wash.	LCDR R. S. Case, MC, USN	(206) 257-2937

(This list was obtained through the courtesy of Code 313, BUMED.)

✠ In Memoriam ✠

RADM Thomas L. Allman, MC, USN (Ret.), died following a heart attack on 24 Nov. 1970 in Scottsville, Va. RADM Allman was born in Virginia on 9 March 1899. He graduated from the University of Virginia Medical School in 1930; his active duty commenced the same year. He was awarded the Bronze Star for service at Pearl Harbor, 7 Dec. 1941. He served as Force Medical Officer, Atlantic Fleet in 1950. RADM Allman was Health Director of several Northern Virginia counties after retirement from naval service, and lived in Scottsville, Va. He is survived by his widow Drusilla and two sons.

CAPT Edward John Jaruszewski, MC, USN (Ret.), died 2 Dec. 1970 in Tucson, Ariz., after a long illness. CAPT Jaruszewski was born 23 Aug.

1913 in Chicago, Ill. He graduated from the University of Illinois Medical School in 1940 and entered on active duty the same year. After completing the course of instruction at NAS Pensacola, Fla., he served as a Flight Surgeon until 1946, when he was assigned to Great Lakes Naval Hospital for residency training. He was a member of the naval hospital staff in USS Consolation from Feb. 1953 to April 1954. Dr. Jaruszewski was certified by the American Board of Internal Medicine and was a Fellow of the American College of Physicians. Subsequent duty assignments included Chief of Medicine at Naval Hospital Newport, R.I., and Executive Officer at Naval Hospital St. Albans, N.Y. His name was placed upon the TDRL 1 Aug. 1968. He is survived by his widow Jeanette and two children.

(Continued from p. 29)

Summary

Recent developments in personnel assessment have emphasized the need to consider and integrate many kinds of information about an individual and to define as clearly as possible the specific criterion behaviors to be predicted. Previous research has demonstrated that the validity of predictors tends to vary over groups and situations. The present study is concerned with the predictability of three Antarctic

occupational groups on five performance measures utilizing a variety of predictor sources. Specificity of predictors for the various groups and criteria is evaluated. This type of analysis may help identify conceptually meaningful predictors for varied work roles in extreme environments.

(The references may be seen in the original article.)

United States Navy Medicine

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